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Recent Literature on Dynamic and Physical Oceanography (Supplement), p. 731

9 June 1958 No. 6

METEOROLOGICAL ABSTRACTS AND BIBLIOGRAPHY

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METEOROLOGICAL ABSTRACTS AND BIBLIOGRAPHY is a monthly publication devoted to:

A. Current Abstracts in English on important meteorological literature in every language.

B. Bibliographic references to other items of interest to the profession.

C. Selective, annotated bibliographies on subjects of immediate and special interest to meteorologists.

SUBSCRIPTION RATE: $8.00 per year to members and non members. Single and back issues $3.00. Back volumes, $10 per volume.

This publication has been made possible through support and sponsorship extended by the Geophysics Research Directorate of the Air Force Cambridge Research Center, Air Research and Development Command, under Contract No. A. F. 19 (604)-2062.

METEOROLOGICAL ABSTRACTS AND BIBLIOGRAPHY

MALCOLM RIGBY, Editor

Vol. 9 JUNE 1958 No. 6

SPECIAL FEATURE IN THIS ISSUE

Recent Literature on Dynamic and Physical Oceanography (Supplement)

By
Mary L. Rice

(For complete table of contents see back cover)

Published monthly at Prince and Lemon Streets, Lancaster, Pa., by the AMERICAN METEOROLOGICAL SOCIETY, 3 Joy Street, Boston 8, Mass.

Printed and issued by: Lancaster Press, Inc.

LIST OF PERIODICALS

Note: This list contains the titles of the periodicals which regularly contain material on meteorology or related fields and it comprises only a small percentage of the periodicals from which pertinent articles are abstracted. The form of serial entry adopted by MAB is given in bold face type below.

PERIODICALS IN WHICH METEOROLOGICAL ARTICLES REGULARLY APPEAR

★**Acta Geophysica Polonica,** [Warsaw].
Akademiia Nauk SSSR, Izvestiia, Ser. Geogr. and **Ser. Geofiz.,** [Moscow].
American Geophysical Union, Transactions, [Washington].
★**American Meteorological Society, Bulletin,** [Boston].
★**Angewandte Meteorologie,** [Potsdam].
Annales de Géophysique, Centre National de la Recherche Scientifique, [Paris].
★**Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. A and Ser. B,** [Vienna].
Australian Journal of Physics, [Melbourne].
★**Australian Meteorological Magazine,** [Melbourne].
★**Ciel et Terre,** Société Belge d'Astronomie, Météorologie et Physique du Globe, [Brussels].
★**Geofisica e Meteorologia,** Società Italiana di Geofisica, [Genoa].
Geofisica Pura e Applicata, Istituto Geofisico Italiano, [Milan].
★**Geophysical Magazine,** Japan Meteorological Agency, [Tokyo].
Hemel en Dampkring, [The Hague].
★**Időjárás,** Magyar Meteorólogiai Társaság and Országos Meteorológiai Intézet, [Budapest].
★**Indian Journal of Meteorology and Geophysics,** [Delhi].
★**Journal of Atmospheric and Terrestrial Physics,** [London].
Journal of Geophysical Research, [Washington]
★**Journal of Meteorological Research,** [Tokyo].
★**Journal of Meteorology,** American Meteorological Society, [Boston].
★**Journal Scientifique de la Météorologie,** Société Météorologique de France, [Paris].
★**The Marine Observer,** Air Ministry, Meteorological Office, London.
★**The Meteorological Magazine,** Air Ministry, Meteorological Office, London.
★**Meteorologické Zprávy** [Prague].
★**Meteorological Society of Japan, Journal,** [Tokyo].
★**La Météorologie,** Société Météorologique de France, [Paris].
★**Meteorologiia i Gidrologiia,** [Leningrad].
★**Meteorologische Rundschau,** [Berlin].
★**Monthly Weather Review,** U. S. Weather Bureau, Washington, D. C.
Polarforschung, Archiv für Polarforschung, [Kiel].
★**Przegląd Meteorologiczny i Hydrologiczny,** [Warsaw].
Revista de Geofísica, Instituto Nacional de Geofísica, [Madrid].
★**Revista Meteorologica,** Junta Nacional de Meteorología, Montevideo.
★**Rivista di Meteorologia Aeronautica,** Servizio Meteorologico, [Rome].
★**Royal Meteorological Society, Quarterly Journal,** [London].
★**South Africa, Weather Bureau, Notos,** [Pretoria].
★**Tellus,** Svenska Geofysiska Föreningen, Stockholm.
Vsesoiuznoe Geograficheskoe Obshchestvo, SSSR, Izvestiia, [Leningrad].
★**Weather,** Royal Meteorological Society, [London].
★**Weatherwise,** American Meteorological Society, [Boston].
★**Wetter und Leben,** Österreichische Gesellschaft für Meteorologie, [Vienna]
★**WMO Bulletin,** World Meteorological Organization, [Geneva].
★**Zeitschrift für Meteorologie,** Meteorologisches Observatorium, Potsdam.

★ Indicates those periodicals which are primarily meteorological.

FOREWORD

Meteorological Abstracts and Bibliography is a monthly publication whose purpose is to bring to the attention of meteorologists current literature in their field and in related fields and to provide bibliographic information on various subjects, as interest demands.

Part I contains abstracts of current literature in the fields of meteorology, oceanography, etc., arranged according to the Universal Decimal Classification.

Part II of each issue comprises an annotated bibliography of important references on a special subject (usually arranged chronologically). No attempt is made to prepare exhaustive bibliographies; instead, the aim is to include a representative cross section of the various aspects of a subject.

Bibliographies published in the successive issues were:

Vol. I, 1950

1. Atmos. Pollution	2. Aerobiology	3. Cloud Physics	4. Hail
5. Tornadoes	6. Volcanic Dust	7. Climat. Changes	8. Thunderstorms
9. Icing	10. Acoust. Propagation	11. Evaporation	

Vol. II, 1951

1. Extended Forecast.	2. Long Range Forecast.	3. Soil Temp.	4. Constants, etc.
5. Clim. of Near East	6. Clim. of Middle East	7. Special Winds	8. Radar Storm Detect.
9. Condensation Trails	10. Clim. of N.E. Africa	11. Mountain Met.	

Vol. III, 1952

1. Clim. of N.W. Africa	2. Carbon Dioxide	3. Clim. of Argentina, etc.	4. Dew
5. Objective Forecast.	6. Stratus Forecast.	7. Urban Climatology	8. Clim. of C. Africa
9. Visibility	10. Glaze and Rime	11. Free Air Turbulence	

Vol. IV, 1953

1. Turbulence Theory	2. Turbulent Diffusion	3. Frost	4. Clim. of Australia, etc.
5. High Level Winds	6. Winds in Stratosphere	7. Jet Stream	8. Radiation Bioclim.
9. Clim. of Pacific	10. Auroras	11. Sferics	

Vol. V, 1954

1. Oceanog. Met.	2. Clim. of S.E. Asia	3. Auroral Physics	4. Tropopause
5. Balloons	6. Numerical Forecast.	7. Radiation Data	8. Vertical Motion
9. Clim. of Arctic	10. Industrial Met.	11. Wind Waves and Swell	

Vol. VI, 1955

1. Bibliog. of Bibliog.	2. Texts & Monogr. Bibliogs.	3. Storm Surges	
4. Ionospheric Prop.	5. Photochem.—Upper Atmos.	6. Cloud Physics	
7. Radar Cloud Physics	8–9. Atmos. Nuclei	10. Weather Modification	11. Cooling Power

Vol. VII, 1956

1. Synoptic Met.-Arctic	2. Clim. of Enclosed Spaces	3. Cosmic Rays (–1952)
4. Cosmic Rays (1953–56)	5. Atmos. Radioactivity	6. Inversions
7. Snow Micromet.	8. Snow Micromet. (Suppl.)	9–11. Tropical Cyclones

Vol. VIII, 1957

1. Solar Weather Relations	2. Night Airglow	3. Forecasting Special Elements
4. Forest Micrometeorology	5. Hydromet. Forecasting	6. Numerical Forecasting (Suppl.)
7. Albedo 8. Meteors	9–10. Tropospheric Propagation	11. Medical Meteorology

Vol. IX, 1958

1. Radioastronomy	2. Solar Astrophysics	3. Radioactivity in Atmosphere
4. Waves and Currents	5. Physical Oceanog.	6. Dynamic & Phys. Oceanog.

Other bibliographies in preparation are:

Actinometers	*Long Range Forecasting*	*Radar Meteorology*
Geomagnetism	*Mesometeorology*	*Singularities*
High Atmosphere Temperatures	*Ozone*	*Synoptic Aerology*

Part III contains a listing of reviews, translations, reprints, and the contents of important publications. These are published in the earliest issue where space permits.

Part IV is made up of author, subject and geographical indexes. The December issue comprises cumulative author, subject, geographical and journal indexes.

EXPLANATIONS

Location of material: For each entry, a symbol is given for at least one library where th material may be found. The Union List of Serials (Gregory) is the source of most of th symbols used. In some cases, where no symbol has been assigned to a library, one will b devised according to the principles of the Union List.

Library symbols used frequently may be found in the following list:

DA:	U. S. Dept. of Agriculture Library, Washington, D. C.
DBS:	U. S. Bureau of Standards Library, Washington, D. C.
DGS:	U. S. Geological Survey Library, Washington, D. C.
DLC:	Library of Congress, Washington, D. C.
DN-HO:	U. S. Navy Hydrographic Office Library, Suitland, Md.
DNLM:	U. S. National Library of Medicine, Washington, D. C.
DSI:	Smithsonian Institution Library, Washington, D. C.
DWB:	U. S. Weather Bureau Library, Washington, D. C.
GB-MO:	Great Britain, Meteorological Office Library, Harrow, England.
MH-BH:	Harvard University, Blue Hill Observatory Library, Milton, Mass.

Other symbols:

*	before an entry indicates a good data source.
†	before an entry indicates a good bibliography.
§	before an entry indicates a synoptic case history study accompanied by charts

Geographic locations are in the English form rather than the form used locally, for example Moscow for Moskva.

Titles of articles or monographs are in the language of the original article unless otherwis stated. Slavic (Cyrillic) titles are transliterated into the Roman alphabet according to th Library of Congress transliteration scheme.

Abbreviations:

Titles of periodicals are not abbreviated, as a rule.

The months of the year from March to July are not abbreviated. Other months ar abbreviated as Jan., Feb., Aug., Sept., Oct., Nov., and Dec.

The word or abbreviation for Volume (Tom, Band, Jahrgang, Año, etc.), for Numbe (Heft, Fascicule, Vypusk, etc.) and for page or pages is omitted from most entries. Thus a entry will read as follows:

Meteorologische Rundschau, 2(5/6):146–151, May/June 1950.

This indicates that the article appeared in *Meteorologische Rundschau*, *Jahrgang* 2 (Vo 2), *Heft* 5/6 (No. 5/6), *pages* 146–151, May/June 1950.

PART I. ABSTRACTS OF CURRENT METEOROLOGICAL MATERIAL

MAJOR GENERAL WORKS

COLLECTED WORKS

9.6–1 551.509.31:551.515.11

Chicago. Univ. Dept. of Meteorology, **Experiment in forecasting the displacement of troughs and ridges, by the staff members, Weather Forecasting Research Center,** ed. by C. W. Newton. Contract AF 19(604)-1293, Technical Report No. 5, July **1955.** 76 p. figs., tables, 23 refs. Contents: Newton, Chester W. and Schallert, William L., **General features of wave pattern,** p. 4–8. Hage, Keith D., **Linear extrapolation, extrapolation with acceleration, and the grid method,** p. 9–29. Erickson, Carl O., **Petterssen's wave formula,** p. 30–37. Ellis, John O., **Rossby's longwave formula,** p. 38–42. Erickson, Carl O., **Constant absolute vorticity trajectories,** p. 43–49. Ellis, John O., **Streamline-isotherm amplitude relationships,** p. 50–52. Bradbury, Dorothy and Schallert, William L., **Pressure-kinematic extrapolation,** p. 53–57. Estoque, Mariano A. and Mihaljan, John M., **Fjörtoft's barotropic graphical numerical forecasting technique,** p. 58–66. Newton, C. W., **Comparison of trough forecasts by different methods,** p. 67–74.—A comprehensive and long range test is being made of the rule developed for forecasting cyclogenesis: "cyclogenesis will occur when and where a well-developed high-level (e.g., 300 mb) positive vorticity advection region becomes superimposed over a low-level barocline [frontal] zone along which the thermal advection is discontinuous." To supplement this a number of other methods of forecasting motion of upper-level systems were tested by the various authors working under the direction of S. PETTERSSEN. Each method is evaluated and the quantitative results shown in graphical and tabular form. *Subject Headings:* **1. Cyclogenesis forecasting 2. Forecasting techniques. I. Newton, Chester W.** (*ed.*).—*M.R.*

9.6–2 551.586:577.4

†United Nations Educational, Scientific and Cultural Organization (UNESCO), **Human and animal ecology: reviews of research.** Its *Arid Zone Research,* Vol. 8, **1957.** 244 p. figs., tables. Extensive bibliog. at end of each article. Articles in French or English, with summaries. **DWB** (M86:599.9 U58h), **DLC**—The six reports published in this volume (abstracted separately) cover the following aspects of the human and animal ecology of the arid zones: Influence of environment in arid regions upon the anatomy, physiology, biochemistry and pathology of human being, including the adaptation of local and immigrant population to this environment. (For listing of articles, *see* Pt. III, June 1958, *MAB.*) *Subject Headings:* **1. Human ecology 2. Animal ecology 3. Arid zone research.**

TEXTBOOKS

9.6–3 551.508.57:551.574.1(02)

*†Mason, B. J., **Physics of clouds.** *Oxford Monographs on Meteorology,* ed. by P. A. Sheppard, Vol. 1, published London, Oxford Univ. Press, **1957.** 481 p. 165 figs. (incl. 39 half-tone plates), bibliog. p. 446–470. Price: 70 sh. **DLC** (QC921.5M3)—A most substantial and satisfactory text on the various aspects of the rapidly growing subject of cloud physics and artificial cloud modification. It summarizes the knowledge contained in over 600 articles by the many prolific writers in this field, and includes beautiful photos, graphs, charts, nomograms and tables from the best and most recent sources. The bibliography by the author is extremely thorough. Chapters include: Introduction; Macro-physics of clouds; 1) Condensation in clean air; 2) Condensation nuclei; 3) Cloud and fog drop growth; 4) Ice forming

nuclei; 5) Snow crystal formation; 6) Precipitation physics; 7) Artificial precip. stimulation; 8) Radar cloud and precip. studies; Appendix A) Collision efficiency of drops; B) Physical properties of falling drops. *Subject Headings:* **1. Cloud physics textbooks 2. Artificial precipitation 3. Radar cloud physics studies 4. Bibliographies on cloud physics.**—*M.R.*

9.6–4 551.5:519.2(02)

Panofsky, Hans A. (*Pa. State Univ.*) and Brier, Glenn W. (*U. S. W. B., Wash., D. C.*) **Some applications of statistics to meteorology.** University Park, Pa., College of Mineral Industries, The Pennsylvania State Univ., **1958.** 224 p. 21 figs., 45 tables, refs., eqs. **DWB; DLC** (QC874.P3)—A series of lecture notes used in a course in meteorological statistics at Penn. State Univ. prepared by PANOFSKY has been revised and supplemented by BRIER and further supplemented by J. LEITH HOLLOWAY (Smoothing and filtering) and H. C. S. THOM (Transformation of frequency distribution). ROGER ALLEN was co-author of the chapter on Forecast verification. The main chapters are: 1) Frequency distributions, 2) Theoretical frequency distribution, 3) Sampling theory, 4) Analysis of relationship between 2 variates; 5) Between more than 2 variates; 6) Time series; 7) Space variation of meteorological variables, 8) Statistical weather forecasting and 9) Forecast verification. A very thorough subject and author index is provided. Although a number of modern applications (such as the Incomplete Gamma Function) to meteorology are incorporated, the text does not presuppose any previous knowledge of statistics, but is intended for advanced students of meteorology with a good mathematical training. *Subject Headings:* **1. Statistics in meteorology 2. Meteorological statistics textbooks 3. Statistical forecasting 4. Forecast verification.**—*M.R.*

9.6–5 551.55:533.607(02)

Pope, Alan, **Wind-tunnel testing.** 2d ed. New York, John Wiley. London, Chapman and Hall, **1954.** 511 p. 337 figs., 24 tables, refs. at end of each ch. Price: 68 sh. **DLC.** Review in *Royal Meteorological Society, Quarterly Journal,* 82(354):549, Oct. **1956.**—A text for undergraduate use, covering the wind tunnel, its design, instrumentation and calibration; model force moment and pressure measurement; testing procedures, boundary corrections; use of data, small wind tunnels, nonaeronautic uses, rotor testing, transonic testing and supersonic testing. In Ch. 9 on nonaeronautic uses, testing of bridges, pollution models of cities and topographical effects are treated. The book is full of theory, data and empirical curves, nomograms, etc. *Subject Heading:* **1. Wind tunnel testing textbooks.**—*M.R.*

9.6–6 551.577.38(78)

†Weaver, John Ernest (*Dept. of Botany, Neb. Univ.*), **North American prairie.** Lincoln, Nebraska, Johnsen Pub. Co., **1954.** 348 p. 87 figs. (incl. photos), 7 tables, bibliog. p. 332–339; **DLC** (QK938.P7W4)—Climate and soil of the Great Plains are discussed briefly on p. 7–8; and drought on p. 221–232. Effects of drought on vegetation and soil are treated on p. 233–248. References are made to a number of important papers on the climate (and its effects) of the prairies of the Central U. S. and southern Canada. *Subject Headings:* **1. Drought Great Plains 2. Ecology 3. Great Plains.**—*M.R.*

9.6–7 551.582.3:551.556.4:551.585(52)

Yazawa, Taije, **Kiko Keikan.** [Climatic landscape.] Tokyo, Kokin Book Co., Ltd. **1953.** 227 p. 58 figs., tables, 20 photos, refs. In Japanese. **DLC**—Geographical climate of Japan is described from the standpoint of landscape in 7 chapters: 1) Introduction, 2) Characteristics of the climate of Japan, 3) Climatological analysis of plant landscapes, 4) Wind-erosion landscapes, 5) Climatic characteristics of village landscapes, 6) Climatic characteristics of farming landscapes and 7) Shelter belt as a climatic landscape. A very unique work. *Subject Headings:* **1. Climate of Japan 2. Climatic analysis 3. Shelter belts 4. Soil erosion 5. Japan.**—*H. Arakawa.*

9.6–8 551.5(02):087.5

Belliard, Eliane; Belliard, Robert and Salomon, Gilbert, **Météorologie.** [Meteorology] Introd. by A. Viaut. Illus. by Michel Renaudon. Paris, Service de la Formation Aéronautique et des Sports Aériens, **1956.** 132 p. 9 refs. **DLC** (QC861.B35)—An elementary text

in the rudiments of meteorology and observation of the usual surface and upper air elements, forecasting and aeronautical meteorology for use in secondary schools. The purpose is to arouse the interest of school children in the applications of meteorology to aviation (and other fields) as well as to acquire a knowledge of the atmospheric processes themselves. The 4 chapters deal with: 1) the atmosphere, 2) clouds, 3) large scale atmospheric instruments (air masses, fronts, winds, general circulation, cyclones, forecasts) and 4) small scale atmospheric movements (stability, thermals, orographic effects, soaring). The work is profusely illustrated and each ch. is followed by questions and workable problems or experiments. *Subject Headings:* **1. Meteorology textbooks 2. Juvenile literature.**—*M.R.*

MONOGRAPHS

See also: **Canada Met. Div. Circulars**, 9.6–42; **Dune stabilization, U. S. coastal region**, 9.6–83; **Desert climatology, Southwest U.S.** (Clements), 9.6–255; **Light scattering tables** (Gumprecht, Sliepcevich), 9.6–271; **Statics and dynamics, Atlantic Ocean** (Wüst), 9F-188.

9.6–9 551.46

†*Alekin, Oleg A., **Osnovy gidrokhimii.** [Principles of hydrochemistry.] Leningrad, Gidromet. Izdatvo., **1953.** 296 p. 66 figs. (1 fold.), 77 tables, refs., bibliog. p. 294–296, numerous eqs. **DLC** (QD181.H1A46)—Hydrochemistry is defined as the chemistry of natural waters and includes both the chemical characteristics and the chemical processes in natural waters. This comprehensive treatise covers the following topics: the significance of hydrochemistry as a science and the history of its development; properties of water as a solvent, including molecular structure of water and its solvent action upon solid particles, gases, etc.; the chemical constitution of natural waters, methods of hydrochemical investigations; chemical constitution of atmospheric precipitation, of underground waters, of river waters, of lake waters and of sea waters and the significance of the chemical properties of water in their utilization. The book contains extensive data presented in tables, graphs and on maps. *Subject Heading:* **1. Hydrochemistry.**—*I.L.D.*

9.6–10 551.577.37:551.311:631.4

*†Gegenwart, Wilhelm, **Die ergiebigen Stark-und Dauerregen im Rhein-Main-Gebiet und die Gefährdung der landwirtschaftlichen Nutzflächen durch die Bodenzerstörung.** [The intense and persistent rains in the Rhine-Main region and danger of soil erosion to the agricultural land.] Frankfurt a.M., Verlag Waldemar Kramer, **1952.** 52 p. 17 maps, 6 tables, 50 refs. At head of t-p: *Rhein-Mainische Forschungen*, Heft 36; *Untersuchungen über die Bodenzerstörung im Rhein-Main -Gebiet, 3.* **DLC** (QC925.4.G42R5)—The contents of this monograph are as follows: a review of the literature on intense and persistent rainfall; the statistical treatment of the rainfall data which includes the calculations of the mean and standard deviation, analysis of the monthly and annual totals of these types of rainfall; the extreme occurrences of intense and persistent rainfall, comparison of normal mean rainfall amounts, the amount of extreme and persistent rainfall in the total rainfall, the intense rainfall associated with thunderstorms, the soil eroding action of intense and persistent rainfall and variation of Rhine-Main landscapes in respect to soil erosion. Rainfall data are presented numerically in tables and graphically as isohyets. *Subject Headings:* **1. Rainfall intensities 2. Rainfall effects on erosion 3. Rhine-Main Region, Germany.**—*I.L.D.*

9.6–11 551.509.5:551.579 551.578.46

*California. Dept. of Water Resources, **Water conditions in California, Feb.–May, 1957,** (and) **Water Conditions in California, Feb.–May, 1957.** Basic data. 8 pieces, about 25 and 30 p. respectively. charts, tables. **DWB** (M78.46 C153w, 1957)—Precip., snowpack, surface reservoir storage, stream flow and a forecast of water conditions for the season based on data as of Feb. 1, 1957, for the 7 drainage areas of Calif. The forecast called for a 75% mean runoff for April–July, with reservoirs standing at 53% of total capacity, but amounting to 104% of average 10 year storage for the reservoirs in use that long. The basic data up to Feb. 1 is contained in a separate report, followed by 2 reports for March 1, April 1 and May 1.

By May 1, storage was 64% of capacity. Each report contains a colored precip. (per cent c normal) chart of the state and other graphs and charts, as well as extensive data tabulation of precip., snow pack and snow water content, runoff, etc. *Subject Headings:* **1. Hydrologi forecasting 2. Snow survey data 3. California.**—*M.R.*

9.6–12 551.510:536.

Gilmore, F. R., **Equilibrium composition and thermodynamic properties of air to 24,000°K** *Rand Corporation, Santa Monica, Calif. Research Memorandum RM*-1543, Aug. 24, 1955 68 p. 7 figs., 15 tables, 55 refs., 26 eqs. **DWB**—Previous calculations of the high-temperatur thermodynamic properties of air are inaccurate because they use the old low value for th dissociation energy of nitrogen, or inadequate because they cover only a narrow density range The present paper reports results for the composition, pressure, energy and entropy of dry ai at eleven temperatures between 1000 and 24,000°K and eight densities between 10^{-6} and 1 times normal density. The calculations assume an ideal gas mixture in chemical equilibrium including dissociation and ionization. In the composition tables, a number of gases presen in such small amounts that they have a negligible effect on the thermodynamic properties are included because of their possible effect on other properties of air. The ideal-gas interna energies and free energies of 29 different molecules, atoms and ions, which were evaluated a various temperatures, are also reported. In addition, the fractions of the diatomic molecule in each electronic state are tabulated. Hugoniot (shock wave) curves for air at various initia densities are also included. (*See* 9.6–173.) *Subject Headings:* **1. Air properties 2. Tem perature effects.**—*Author's abstract.*

9.6–13 551.5:681.14:621.3

Institute for Advanced Study, Princeton, N. J., **Electronic computer project.** Contrac DA-36-034-ORD-1646, Final Report, **Pt. 1, Engineering.** Dec. **1956.** 73 p. figs., table photos. **Pt. 2, Computer use for the period July 1, 1954–Dec. 31, 1956.** May **1957.** vari ously paged. foot-refs., eqs. **DWB** (651.264 I59fb)—The several electronic compute projects in astrophysics, atomic and nuclear physics, meteorology and in engineering, etc which have been worked on for 30 months (July 1, 1954–Dec. 31, 1956) under 4 contracts an in some cases for a shorter period, are described and illustrated in some detail in these 2 volume Early in 1956 it was decided that the computer would be used for solutions of local computatio problems rather than embarking on new projects. Some of the problems or projects sum marized are: magneto-hydrodynamic theory of solar spicules, an improved solar model wit carbon cycle included, pulsational stability of stars with convective envelopes, numerica integration of the Navier-Stokes equations for compressible fluids, etc. Vol. 2 deals mostl with machine operation, improvement and other engineering problems. *Subject Heading* **1. Electronic computer applications 2. Princeton computer 3. Numerical forecasting prob lems.**—*M.R.*

NEW SERIALS

9.6–14 550.3(05

Acta Geophysica Polonica, Warsaw, v. 1, no. 1, **1953**–, Latest issue seen, v. 6, no. 1 **1958** Quarterly. Editor, Tadeus Olezak. Issued by the Polska Akademia Nauk, Komitet Geo fizyki. Price, about 15 Cena per issue, from the Akademia, Nowy Świat 72, Warsaw 1 Poland. In English, Polish, French; resumes in Polish, etc. **DWB, DLC** (Slavic)—This ne journal contains articles on meteorology, hydrology, upper atmosphere physics, and bi graphical notes, etc. in Polish, English and French. The first issue gives an obituary on Pro Gorczyński, with a long list of his works (245 items) and an article on 5-day forecasting i Poland. Subsequent issues maintain a high technical standard. Articles are abstracte separately and contents listed in Pt. III of *MAB* from time to time. *Subject Heading* **1. Geophysics periodicals 2. Serial publications 3. Geophysics 4. Poland.**—*M.R.*

9.6–15 551.5(05)(8.0

Special Libraries Association, **Translation Monthly,** Vol. 1, No. 1, (Jan. 1955?), Late issue seen, Vol. 4, No. 4, April **1958.** Monthly. About 25 p. per issue. Issued by Joh Crerar Library for the Special Libraries Association Translation Center. Beginning Ja

1957, the Center assumed the services formerly provided by the Science Translation Center, Library of Congress, Wash., D. C., in its **Bibliography of Translations from Russian Scientific and Technical Literature.** Chairman of editorial committee, John P. Binnington. Price: annual, $5.00, from SLA Translation Monthly, John Crerar Library, 86 East Randolph Street, Chicago 1, Ill. Back issues of the **Bibliography of Translations from Russian Scientific and and Technical Literature** available at $.25 per number. Photostat copies and microfilm obtainable. **DLC**—Each issue contains a score or more titles of translations of articles or works in meteorology—not only translations from Russian, but from German, French, Italian, Chinese, etc. Material in other (related) fields, such as geophysics, electricity, physics, is also included. Availability of each document is indicated. Original titles are not always given. Annual author index, v. 3, 1957 has been published. *Subject Headings:* **1. Serial publications 2. Translation lists 3. Russian translations.**—*M.R.*

POPULAR SCIENCE BOOKS

See also: **Arctic expeditions** (Caswell), 9.6–22.

9.6–16 551.583.14

Nishioka, Hideo, **Long warm weather cycle ahead: history of cold and warmth.** Illus. by Kirkpatrick. N. Y., International Economic Research Bureau, **1957.** 91 p. 19 figs., 25 tables. Japanese-English glossary, p. 85–87. On back-cover, port. of author. **DWB** (M8 N724L)—A popular monograph containing a dozen chapters, each bringing out the importance of long period cycles in human activity or the supposed evidence for these cycles over the past 1300 years in Japan and vicinity. Tree rings, southward advance of sea lions, nonfreezing of Lake Suwa, changes in distribution of horse chestnut, increase or decrease of species of shell mounds, earthen images wearing snow-goggles, blooming period of cherry blossoms and cherry viewing, study of auroral frequencies and limits as seen in Japan (621–1941 a.d.) and Korea (1012–1675), rising trend in temp. in late years, movement of nomadic people, recent dry weather and its medical effects. A glossary of Japanese terms, a chronological table of China and Japan and 700-year cycle of cold and warmth are appended. The work is full of graphs, charts, clever illustrations, and tables of data obtained from numerous sources. The conclusions cover many areas of culture and physical conditions of the earth and man, but it is pointed out that although the 700-year cycle is evident in the data presented, there are many points to be resolved before it can be properly interpreted in all respects. *Subject Headings:* **1. Climatic changes in Japan 2. Climatic cycles 3. Auroras in Japan 4. Japan.**—*M.R.*

MANUALS

See also: **Antarctic bibliogs.** (Roscoe), 9.6–30; **Publication lists and met. textbooks,** 9.6–58. **Light scattering tables** (Gumprecht, Sliepcevich), 9.6–271.

9.6–17 551.509.5(02)

U. S. Weather Bureau, **Practice forecast program.** Its *Multiple Address Letter*, No. 19–55, March 3, **1955.** each section separately paged. forms. **DWB**—Practice forecasts may now be made for 26 stations in U. S. by about 200 employees of U. S. Weather Bureau. Details of program, who may participate, time for preparation, regulations as to mailing, punching, errors, use of climatic data, verification, elements forecast and stations to be forecast for given periods are contained in this manual. Each observer forecasts for 2 out of 3 stations selected for each 3 week period of year. Alaskan forecasters select 1 out of each 3. Climatological data are appended for the 26 stations (wind, precip., and temp. frequencies for 4 quarters of day in each 3 week period). *Subject Headings:* **1. Practice forecast manuals 2. Climatic data for practice forecasts 3. Manuals.**—*M.R.*

9.6–18 551.5:355(02)

U. S. Dept. of the Army, **Meteorology for artillery.** Its *Technical Manual*, TM 20-240, Nov. **1950.** 132 p. illus., forms. "This manual together with TM 20-241, Nov. 10, 1950, supersedes TM 24-240, Nov. 30, 1944." **DWB** (355.08 U582t)—Systematic textbook style

treatment of: I—the atmosphere affecting artillery; II—clouds, weather, air masses and fronts; III—meteorological equipment such as ground stations, radiosondes, radio direction finders etc.; IV—surface observations (temperature, relative humidity, pressure and wind); V—winds aloft and ballistic winds; VI—upper air density and temperature; VII—weather and sound ranging; VIII—coding, distributing and filing data; IX—weather liaison; X—operating procedures; XI—special operations (Arctic and tropical); with a glossary and extensive index. The manual is full of excellent photos of equipment, instruments, observational and computation forms and emphasizes instruments and observations rather than theory. *Subject Headings:* **1. Artillery meteorology 2. Ballistic meteorology 3. Military meteorology 4. Meteorological instruments 5. Manuals.**—*M.R.*

9.6–19 533.

†Hilsenrath, Joseph et al., **Tables of thermal properties of gases comprising tables of thermodynamic and transport properties of air, argon, carbon dioxide, carbon monoxide, hydrogen, nitrogen, oxygen, and steam.** *U. S. National Bureau of Standards, Circular,* No. 564, Nov. 1, **1955.** 488 p. figs., tables. bibliogs. throughout. **DWB** (536.7 H655t)—A large volume containing tables of constants, thermodynamic properties of real and ideal gas, vapor pressure, density, compressibility factor, specified heat, enthalpy, entropy, sound velocity, viscosity, thermal conductivity, Prandtl number, etc. for air, A, CO_2, CO, H_2, N_2, O_2, and H_2O, together with conversion tables, etc. for pressures up to 100 atmospheres, and temperatures to 600°K for H_2, 1500°K for CO_2, 850°K for H_2O and 3000°K for other gases. *Subject Headings:* **1. Gas tables 2. Conversion tables 3. Thermal properties of gases.**—*M.R.*

9.6–20 551.501.42:551.508.4

Dobrokhotov, Iuriĭ Sergeevich and Troitskiĭ, Boris V., **Rukovodstvo po rabote s topograficheskim vysotomerom.** [Manual for topographical height surveying.] Moscow, Izd-vo Geodezicheskoĭ Lit-ry, **1954.** 79 p. 12 figs., 12 charts (1 fold.), 11 tables, foot-refs., eqs. **DLC** (QC895.D64)—The corrections to be applied for levelling during topographic surveying with a barometer are explained in detail and nomograms, tables and examples given for practical use. The corrections for various factors include those for air mass temperature, humidity, wind (vertical currents in valleys or mountains), and temperature of the mercury column scales, etc. The meteorological influences are described and illustrated by schematic diagrams. *Subject Headings:* **1. Barometric levelling corrections 2. Topographic surveying manual 3. Manuals.**—*M.R.*

GENERAL GEOPHYSICS AND METEOROLOGY

ARCTIC RESEARCH

9.6–21 551.506.5(98

Bushnell, Vivian C. (*Geophy. Res. Dir., A. F. Camb. Res. Center, Air Res. and Dev. Command*), **Marvin's ice shelf journey, 1906.** *Arctic,* Ottawa, 9(3):166–177, **1956.** fig., photo. 4 refs. **DWB, DLC**—Ross G. Marvin, a member of Peary's expedition, submitted in 1906 a report on his journey on the ice shelf along the north coast of Ellesmere Island where he made ocean soundings along the front of the Ellesmere ice shelf. This report is now published for the first time. A brief comparison is made between these early observations and the more recent ones by Hattersley-Smith and Crary. *Subject Headings:* **1. Arctic expeditions 2. Ellesmere Island.**—*I.L.D.*

9.6–22 551.506.5(98

†Caswell, John Edwards, **Arctic frontiers: United States explorations in the Far North.** 1st ed. Norman, University of Oklahoma Press, **1956.** 232 p. figs., numerous photos. refs., bibliog., p. 216–225. **DLC** (G630.A5C3)—Among the Arctic expeditions described in the 13 chapters of this popular book on U. S. explorations, are those of the first International Polar Year to Lady Franklin Bay (Ch. VI) and to Point Barrow (Ch. VII), headed by General Greely and Lt. Patrick Henry Ray, respectively. The information on these expeditions is unusually detailed and well documented from the point of view of the history of the organiza

tion of the Polar Year and the financing and carrying out of the expedition and a perspective of the scientific results in various fields. *Subject Headings:* **1. Arctic expeditions 2. International Polar Year, 1882–1883 3. Arctic exploration.**—*M.R.*

9.6–23 551.311.184:550.3

Crary, A. P. and Goldstein, Norman, **Geophysical studies in the Arctic Ocean.** *Deep-Sea Research*, London, 4(3):185–201, **1957.** 25 figs., table, 7 refs. **DWB**—Geophysical studies carried out on the ice island T-3 from April 1952 to October 1953 and April to September 1955 are reported. Discussed in particular are results in ocean bathymetry, seismic reflections, seismic refractions and gravity measurement. *Subject Headings:* **1. Arctic Ice Island (T-3) 2. Geophysical studies 3. Bathymetry 4. Seismology 5. Arctic Ocean.**—*G.T.*

9.6–24 551.506.5(98)

Schmidt, Otto Iul'evich, **Conquest of the Arctic.** Moscow, Foreign Languages Pub. House, **1939.** 43 p. photos. "Trans. of his **Zavoevanie Arktike." DWB, DLC** (G630.R8545) —An inspirational pamphlet describing the following: heroic efforts of Soviet (and other) explorers to conquer the Arctic, the Papanin Expedition, the opening of the Northern Sea Route, the functions of the Northern Sea Route administration under direction of the author, airplane flights over Arctic Ocean and coasts, rescue operations, scientific and economic aspects, the 51 Soviet weather stations in Arctic, etc. *Subject Headings:* **1. Arctic expeditions 2. Soviet Arctic.**—*M.R.*

9.6–25 551.583.3:581.16

Terasmae, J. (*McMaster Univ., Hamilton, Ontario*), **Palynological study of Pleistocene deposits on Banks Island, Northwest Territories, Canada.** *Science*, Wash., D. C., 123(3201): 801–802, May 4, **1956.** fig., 2 tables, 2 refs. **DLC**—Pollen grains of elm, pine, hemlock, etc. found in sediment samples collected in Banks Island, Franklin District near Cape Kellett (72°N, 120°W) where glacial remains occur, are analyzed and listed. Indications are that the climate was much more favorable for plant growth in the early Pleistocene as forest growth is evident here, 200 mi N.E. of the present timber line. Transport of pollen by wind from a distance is ruled out on grounds of the quantity and nature of the pollen deposits. Species were found that now exist only in the southern Rockies, and in early postglacial sediments in the Great Lakes. Subsequent glaciation eradicated these forests. *Subject Headings:* **1. Pollen analysis 2. Pleistocene period 3. Banks Island, Northwest Territories.**—*M.R.*

9.6–26 551.508.99:551.591

Trailmarkers for Arctic. *Science*, Wash., D. C., 124(3219):435, Sept. 7, **1956. DLC**— The Army Engineers at Fort Belvoir, Va. and General Mills, Inc. of Minneapolis have developed an electronic trail marker designed for assisting scientists and others using trails across glaciers and ice caps (such as Greenland) during blizzards or poor visibility conditions. *Subject Headings:* **1. Electronic trail markers 2. Greenland Ice Cap 3. Greenland.**—*M.R.*

9.6–27 551.55

*Wilson, H. P. and Markham, W. E., **A study of Arctic surface winds.** *Canada. Meteorological Branch, CIR-2923*, TEC-251, May 13, **1957.** 7 p. 8 tables, ref. **DWB**—Statistics are presented on surface winds at Resolute, Mould Bay, Isachsen, Alert and Eureka, N.W.T. The relationship between winds at the surface and at 750 m is studied for Resolute, Eureka and Alert. *Subject Headings:* **1. Surface winds 2. Canadian Arctic.**—*Author's abstract.*

ANTARCTIC RESEARCH

See also: **Norwegian participation in IGY, Antarctica,** 9.6–35.

9.6–28 55(99)

National Academy of Sciences, **Antarctic research: elements of a coordinated program.** Reprinted for the U. S. National Committee for the International Geophysical Year, May 1954, May 2, **1949.** 22 p. ref. **DWB**—A comprehensive program for study of the Antarctic

was proposed in 1948 by a group of scientists and administrators under the chairmanship of the late ISAIAH BOWMAN of Johns Hopkins Univ. The panel included BERKNER, ISELIN, REICHELDERFER and several others from government bureaus or institutions. The recommendations in cartography, geomagnetism, meteorology, ice and snow, biology, oceanography geology, goedesy, seismology and adaptation are outlined and discussed. *Subject Headings:* **1. Antarctic research programs. I. Bowman, Isaiah II. Reichelderfer, F. W.**—*M.R.*

9.6–29 551.506.22:551.524.36(99)

Petrov, Victor P., **Soviet participation in the International Geophysical Year.** *Professional Geographer*, Hamilton, N. Y., 9(2):11–14, March **1957.** 21 refs. **DLC**—Arctic and mid-latitude program to appear in May issue. Russian exploration of Antarctic began in 1821. IGY expeditions in Nov. 1955, 1955–56 work described and 1957 plans outlined. A temperature of 88.2°F was said to have been recorded on Aug. 20, 1956 at the Pionerskaia Station near Mirnyĭ, and a jet stream of 576 km/hr. *Subject Headings:* **1. Russian participation in IGY 2. Record low temperatures 3. Antarctica 4. Mirnyĭ, Antarctica.**—*M.R.*

9.6–30 016(99)

†Roscoe, John H., **Regional photo interpretation series: Antarctica.** *U. S. Air Force, A. F. Manual*, 200-30, Aug. **1953.** 171 p. 343 photos., 2 plates (fold.), 2 maps (fold. in pocket), bibliog. p. 169–171. **DWB**—Manual consists of Ch. 3, 4 and 5 and other portions of his **Contributions to the study of Antarctic surface features by photogeographical methods,** a Thesis, Ph.D., Maryland Univ., 1952. A manual full of excellent aerial photographs of ice, glaciers and land forms in the Antarctic, arranged according to various subjects such as glaciers, shelf ice, icebergs, snow and firn, sastrugi snowdrifts, crevasses, radiation, meltwater, moraines, flora and fauna, etc. The text discusses discovery and exploration, trafficability, climate, etc. Ice blink and whiteout are discussed and illustrated. A good bibliography of bibliographies on the Antarctic and of the best reference literature is included. *Subject Headings:* **1. Antarctic bibliographies 2. Antarctic climate 3. Antarctica.**—*M.R.*

9.6–31 551.506.22(99)

Shcherbakov, D. I., **Nauchnye problemy Antarktiki.** [Scientific problems of the Antarctic.] *Priroda*, Moscow, 45(2):44–55, Feb. **1956.** 13 figs., plate (col.), ref. **DLC**—Soviet program for the Antarctic during IGY is summarized and details of scientific problems and of Soviet participation are outlined and illustrated. Ice, tectonics, meteorology, oceanography, location of bases (especially Mirnyĭ), peculiar glacial formations, fauna, climate, etc. are treated. *Subject Headings:* **1. IGY Antarctic program 2. Soviet participation in IGY 3. Antarctica.**—*M.R.*

IGY

See also: **Soviet participation, Antarctica** (Petrov), 9.6–29; **Soviet participation, Antarctica** (Shcherbakov), 9.6–31; **IGY seminars** (Taylor), 9.6–49; **Satellites** (Van Allen), 9.6–70.

9.6–32 551.506.22

Hewson, E. Wendell (*Mich. Univ.*), **Above this planet called earth: meteorology.** *Michigan Technic*, Ann Arbor, Mich., 74(7):14–16, 64, April **1956.** figs., photos, port., 3 refs. **DLC**—Problems of the general circulation and plans to study these problems during IGY are outlined in this illustrated article. *Subject Heading:* **1. IGY meteorological program.**—*M.R.*

9.6–33 551.506.22

Hulburt, E. O. (*Senior Scientist, U. S. National Committee for IGY*), **The International Geophysical Year, June 1957 through December 1958.** Wash., D. C., U. S. Naval Research Laboratory, Nov. **10, 1955.** 37 p. table. **DWB**—The history of the IGY and the work to be carried out during 1957/8, in 13 separate fields, is discussed, with particular reference to networks, stations, problems to be solved, etc. *Subject Heading:* **1. IGY program.**—*M.R.*

9.6–34 551.506.22

†International Geophysical Year, 1957/1958, Comité Spécial (CSAGI), **Rapports Nationaux présentés à la Réunion de Rome, Sept. 1954 du Comité Spécial de l'Année Géophysique Internationale.** [National Reports, Rome, Sept. 1954. . . .] *International Union of Geodesy and Geophysics, Bulletin d'Information,* 3(7/8):445–578, Sept./Dec. **1954.** bibliogs. **DWB**—Contains reports on Germany (Federal Republic), Argentina, Austria, Brazil, Canada, Spain, United States, Finland, France, Great Britain, India, Ireland, Iceland, Italy, Japan, Morocco, Norway, New Zealand, Netherlands, Peru, Sweden, South Africa and Yugoslavia. Reports include activities proposed for each of the 10 or 12 disciplines involved in the IGY program, at least for the major participants. Maps showing Arctic, Antarctic and longitudinal networks and proposed bases or observation points are included. *Subject Headings:* **1. IGY program 2. IGY networks.**—*M.R.*

9.6–35 551.506.22

Scientific expedition off for 2-year stay in Antarctic. *News of Norway,* Wash., D. C., 13(41):Nov. 22, **1956.**—Role of Norway in Antarctic IGY program is summarized. Meteorology will be stressed at base in Norwegian Sector (1°–3°W and 70°–70.5°S) 200 mi E. of Maudheim. Two radiosonde observations will be made each day. Two other radiosonde stations are being equipped in the Arctic (Bear Island and at Isfjord, Spitzbergen). Three ionospheric (radio-echo) stations will be set up (at Spitsbergen, Tromsø and Kjeller). *Subject Headings:* **1. Norwegian participation in IGY 2. IGY Antarctic program.**—*M.R.*

9.6–36 551.506.22:551.507.362

Vassy, E. (*Faculty of Science, Univ. of Paris*), **L'exploration de la haute atmosphère avec les engins autopropulsés et le programme français de l'Année Géophysique Internationale, 1957/1958.** [Exploration of the upper atmosphere with self-propelled engines and the French program of the International Geophysical Year, 1957/1958.] *International Congress on Astronautics, 5th, Innsbruck, 1954, Bericht,* pub. **1955.** p. 221–225. **DWB** (629.1388 I61, 1954)—Problems of upper atmosphere sounding by optical and acoustical means, recent limited rocket soundings, the First and Second Polar Year programs and the proposed IGY program (especially the rocket program) are described in this article. *Subject Headings:* **1. IGY networks 2. IGY rocket program 3. Rocket research.**—*M.R.*

9.6–37 551.506.22

Wendt, Gerald (*Science Consultant, UNESCO Courier*) **International Geophysical Year.** *UNESCO Courier,* 10(9), Sept. **1957.** 34 p. (Issue mostly devoted to the above subject.) figs., photos. Contents of this issue include: **Operation globe. Man of the year—the scientist. The why and how of IGY. The not so solid earth. The flag of science on the 6th continent. Zero hour for the weatherman. Warnings: special world alert. Our great ocean reservoir. UNESCO and the IGY. Where the sky is black. Meteors: tiny wanderers through space. Man-made satellite. DLC**—This series of illustrated articles on IGY tells about the program in general, the history, chief characters, basic scientific facts about the earth and its interior, the Antarctic program and current activities there, the continental ice, an automatic weather station on the Windmill Islands operated by Australia, the British program, the world data centers and microcard program, the meteorological, oceanographic, auroral, meteor and satellite programs. Each article is a full length popular article summarizing past, present and future plans and achievements in this field. Launching of the satellite was predicted for 1958—"a year which will go down in history for that reason." *Subject Headings:* **1. IGY program 2. Popular meteorology.**—*M.R.*

9.6–38 551.506.22 551.583 621.397(04)

Wexler, Harry, **Weather.** (Paper presented on WRC-TV Science Program, May 13, **1956,** 2:00 P.M.) 6 p. Typescript. **DWB**—In this half-hour television program, Dr. Wexler, Chief of Scientific Services of the U. S. W. B. and head of the Antarctic Meteorological Program for the U. S., goes into the causes of the general circulation of the earth, frontal phenomena, the jet stream, the cause and consequences of the ice age, the recent warming trend in the Arctic, and what we hope to learn from the intensive and extensive investigations

during the IGY, 1957/8, and the earth satellite observations. *Subject Headings:* **1. Television weather addresses 2. Climatic changes 3. International Geophysical Year, 1957–1958** —*M.R.*

9.6–39 551.510.5 551.507.362.2 :629.1

[Whipple, Fred], **Astronomer Fred Whipple wants more basic research by Defense Department: urges start of post-Vanguard projects now** [interview]. *Missiles and Rockets*, Wash., D. C., 2(3):66–57, March **1957.** ports. **DLC**—In this question and answer interview the head of Harvard Astronomical Observatory and of the Smithsonian Astrophysical Observatory gives his opinions on the role of basic research in defense and on the upper air research program for IGY, including the satellite program. He stresses the need for communication and continuity of funds. *Subject Headings:* **1. Upper atmosphere research 2. IGY satellite program.**—*M.R.*

UNESCO—WMO

See also: **North Atlantic weather stations,** 9.6–63.

9.6–40 551.5 :621.396.

Rogers, P., **United Nations calling.** *World Meteorological Organization, WMO Bulletin*, 6(3):99–103, July **1957.** photo. **DWB**—The WMO has provided several radio programs for broadcast to 70 countries in 25 languages by the U.N. Most of these have to do with special projects under the technical assistance program. Examples are cited. Interviews with WALTER T. WILSON of the U. S. W. B. (a hydrologist who was in Turkey) and H. TREUSSART of France who spent some time in Afghanistan as an expert on observations and instruments are quoted. *Subject Headings:* **1. WMO radio broadcast programs 2. WMO. Technical Assistance Program.**—*M.R.*

9.6–41 551.585.5 :00

White, Gilbert F. (*Dept. of Geog., Univ. of Chicago*), **International cooperation in arid zone research.** *Science*, 123(3196):537–538, March 30, **1956. DWB, DLC**—Some of the concrete results of the Arid Zone Research Committee (under UNESCO) during its 5 yrs. of activity are outlined and the program for the coming years summarized. One of the major projects for investigation is "the water requirements of plants (transpiration and its relation to photosynthesis)," and others are the evaluation of water resources, study of hydrologic balance of aquifers, etc. Examples of papers given at the New Mexico meeting in the Spring of 1955 are cited. THORNTHWAITE's study of climates of Africa and India is mentioned. *Subject Headings:* **1. Arid zone research.**—*M.R.*

SERVICES AND INSTITUTIONS

See also: **National Sci. Foundation,** 9.6–56; **Agromet. services, Bonn** (Thran), 9.6–81; **Weather broadcasting, U.S.S.R.** (Hegyi), 9.6–122; **U. S. W. B. hurricane warning serv.** (Reichelderfer), 9.6–165.

9.6–42 05(083.86)

†Canada. Meteorological Div., **Technical Circular Index.** Its *CIR*-2617, TEC 211, Feb. 10, **1955.** 13 p. **DWB, DLC**—A chronological list of *Canada. Met. Div. Technical Circulars* 175–205, issued in 1954, with a short abstract and subject references to each, a subject index (13 categories) and an author index (21 authors). *Subject Headings:* **1. Periodical indexes 2. Canada Met. Div. Technical Circulars.**—*M.R.*

9.6–43 551.5 :061

Khzmalian, K. S., **Vazhnoe sobytie v zhizni gidrometeorologicheskoĭ sluzhby.** [Important event in the life of the Hydrometeorological Service.] *Meteorologiia i Gidrologiia*, No. 8:61–65, Aug. **1956. DWB, DLC**—A detailed report dealing with the meeting of the active members of the Hydrometeorological Service of the U.S.S.R. that was held in Moscow, June 27–29, 1956. The substance of reports presented by the directors of hydrometeorological services of various republics, by directors of various sections of the Central Hydrometeorological Service, etc. are summarized. They deal with various administrative, scientific and

service problems. *Subject Headings:* **1. Meteorological services 2. U.S.S.R. Hydrometeorological Service 3. U.S.S.R.**—*I.L.D.*

9.6–44 551.573:551.579:628.1(058)

*Nyasaland. Water Development Branch, **Annual Report for year ended Dec. 31, 1955.** 16 p. 6 charts (fold.), 6 photos, numerous tables. **DWB**—Annual evaporation for 23 stations in Nyasaland, detailed river flow data, levels of Lake Nyasa, hydrographs for several points (1954–55), and service activities, new stations, etc. are included in this annual report. *Subject Headings:* **1. Evaporation data 2. Hydrologic data 3. Nyasaland. I. Latham, E. W.**—*M.R.*

OBSERVATORIES

See also: **Agromet. stations, Sobakino, U.S.S.R.** (Savinskiĭ), 9.6–80.

9.6–45 522.1

Irwin, John B. (*Goethe Link Obs., Indiana Univ.*), **Southern Hemisphere observatory.** *Science*, 123(3197):577, April 6, **1956. DWB, DLC**—Observatories are few in the Southern Hemisphere compared with those in the Northern. The Union Observatory is moving some of its equipment from Johannesburg to a site on the high veld near Hartebestpoort Dam 20 mi W. of Pretoria because industrial smoke and haze as well as city lights hamper observing. The joint observatory at Harvard Kopje near Bloemfontein has a good site free from city smoke and with fine winter observing conditions. An expedition of 4 European astronomers is examining sites on the high veld in the Karoo for an observatory. *Subject Headings:* **1. Astronomical observatory sites 2. South Africa.**—*M.R.*

9.6–46 550.3:551.501.9(09)

Prikhot'ko, G. F., **100 let so dnia obrazovaniia Kievskoĭ Geofizicheskoĭ Observatorii.** [Hundredth anniversary of the founding of the Kiev Geophysical Observatory.] *Meteorologiia i Gidrologiia*, Leningrad, No. 2:58–59, Feb. **1956. DWB, DLC**—The author summarizes the various papers delivered in connection with the celebration of this anniversary (1955). These deal with the climatic studies carried out in the nineteenth and early part of the twentieth century, the actinometric studies of B. I. Sreznevskii, the role of the observatory in the establishment of weather station networks, hydrometeorological and agricultural research, etc. The type of work carried on and the names of the more important investigators are given. *Subject Headings:* **1. Kiev Geophysical Observatory 2. History of observatories.**—*I.L.D.*

CONFERENCES

See also: **Climatological research, U.S.S.R.**, 9.6–11; **Maximum runoff** (Bitsilli, Grinval'd), 9.6–235; **Hydrometeorological service improvement, U.S.S.R.** (Zigun), 9.6–240.

9.6–47 551.509.6 551.574.1(06)

Houghton, Henry C. (*Dept. of Met., M.I.T.*), **Some impressions at the close of the Conference.** (In: Conference on the Scientific Basis of Weather Modification Studies, Arizona Univ., Tucson, April 1956, **Proceedings.** pub. **1956.** 5 p.) **DWB**—Notes presented in the closing lecture of the conference, giving the authors' ideas of the real progress that has been made in scientific weather control: the question "Does it work?" has shifted . . . and revolves around the question "How well does it work?" Microphysical studies have proceeded satisfactorily. Warm cloud rainfall in tropics is not thoroughly understood, overseeding is not as important as once believed, large scale effects are debatable, statistical evaluation is no better than the crude rain gage measurements on which it is based and, finally, we are just entering the "Golden age of progress" in weather modification, and in fact in the entire field of meteorology. *Subject Headings:* **1. Weather modification progress 2. Cloud physics conferences.** —*M.R.*

9.6–48 52:061.3

Kharadze, E. K., **Mezhdunarodnyĭ s"ezd astronomov v Rime.** [International conference of astronomers in Rome.] *Priroda*, Moscow, 2:62–71, Feb. **1953.** photos. **DLC**—A report on the conference of the International Union of Astronomers held in Sept. 1952 in Rome in

which a delegation of 12 Soviet astronomers took a prominent part. After reviewing the organization, the program and proceedings of the conference, the author points out with great detail the importance of the Soviet astronomers' contribution to the science of astronomy in general and to this conference in particular. The subjects and contents of addresses and lectures delivered at the meeting by Soviet representatives are given in full and commented on, while the work of foreign astronomers is minimized. *Subject Heading:* **1. Astronomical conferences.**—*A.M.P.*

9.6–49 551.506.22:061.3

Taylor, Raymond L., **Preview of AAAS meeting, Atlanta.** *Science*, Wash., D. C., 122(3179):1061–1079, Dec. 2, **1955. International Geophysical Year,** p. 1063–1064. **DLC**—List of nations participating in IGY and of 18 papers on IGY to be presented at Atlanta meeting of AAAS. Three sessions were devoted to IGY on Dec. 27, 28 and 29, 1955. *Subject Headings:* **1. IGY participants 2. IGY seminars.**—*M.R.*

EDUCATION, HISTORY AND BIOGRAPHY

EDUCATION

9.6–50 551.5:331:378

†U. S. National Science Foundation, **Scientific personnel resources: a summary of data on supply utilization and training of scientists and engineers.** Pub. by Foundation, **1955.** 86 p. figs., tables, foot-refs. bibliog., p. 82–83. Meteorologists, p. 43–44. **DWB**—In a thorough study of the supply and utilization of scientists in the U. S., the number, age distribution, level of education, type of employment (Federal, univ., industry, research and development), functions, income, military status, etc. of geophysicists, meteorologists and other physical, earth, medical and social scientists and engineers are tabulated and comparison shown graphically. Information on schools, colleges and universities is also presented. It was estimated that there were about 4000 professional meteorologists in 1955. Of these, 59% were in synoptic meteorology, 4% in climatology, 11% in general, 8% in 6 other fields of meteorology. Another 1000 men are listed under Geophysics in the special fields of Hydrology, Oceanography and Terrestrial Magnetism. Only 12% are in research. The U. S. Govt. employs 82%, industry 12% and colleges 6%. *Subject Headings:* **1. Careers in meteorology 2. Teaching of meteorology.**—*M.R.*

9.6–51 551.5:378(043)

Kirillov, F. A., **Dissertatsii, zashchishchennye na uchenom sovete Geofizicheskogo instituta AN SSSR v 1956g.** [Dissertations defended before the Scientific Council of the Geophysical Institute of the Academy of Sciences of the U.S.S.R. in 1956.] *Akademiia Nauk SSSR, Zapiski, Ser. Geofizich.*, No. 7:876–879, July **1956.** table. **DLC**—Abstracts are presented of those doctoral and masters dissertations of meteorological interest. Ph.D. theses include: **Problems of the theory of atmospheric diffusion** by A. S. Monin, and **Physical theory of meteors and meteor matter in the solar system** by B. Iu. Levin. Masters' theses include: **Brightness of a clear sky in the presence of snow cover** by G. Sh. Livshits (a table with data is given); and **The problem of the origin of the electric field of the atmosphere** by L. V. Lukina. *Subject Headings:* **1. Dissertations in meteorology 2. U.S.S.R.**—*I.L.D.*

HISTORY

See also: **Kiev Geophysical Obs.** (Prikot'ko), 9.6–46; **Marine met. services** (Williams), 9.6–64; **History of weather ships, N. Atlantic and N. Pacific** (Hull), 9.6–67; **Historical climates, France** (Sanson), 9.6–246; **Rainbows** (Boyer), 9.6–273.

9.6–52 551.58

Khrgian, A. Kh., **Outline on the development of meteorology, Ch. 2, Climatology of recent times.** (Translation of Ch. 2 of the original Russian, **Ocherki razvitiia meteorologii,** issued Leningrad, Gidromet. Izdat., **1948.**) 33 p. offset of typescript. **DWB** (M09.K45oE)—This chapter on history of climatology during the 19th and 20th centuries provides the most

thorough and objective analysis of progress in the many schools or aspects of climatology in all parts of the world that has been published to date, although giving more weight to Russian contributions (which are almost completely neglected in other similar reviews) than to those from abroad. Mathematical or statistical climatology, dynamic-, classical-, agricultural-, complex- and microclimatology; climatic changes, paleoclimatology, tree-ring studies, applied and bio-climatology are among the subjects discussed critically. (*See* 1–34, Jan. 1950, *MAB* for abstract of whole book.) *Subject Headings:* **1. Climatology 2. Progress in climatology.** —*M.R.*

9.6–53 551.583.2:551.515.3

†Kyriazopoulos, Basil D., **Micrometeorological phenomenon in Byzantine decoration.** *Thessalonike. Panepistemion. Ergasterion Meteorologias, Meteorologika*, No. 4, **1955.** 11 p. 2 plates, 16 foot-refs.—In this examination of the depiction of acanthus plants on capitols of St. Sophia, Thessalonike, the author attempts to demonstrate that the shape of the leaves represents forms assumed by leaves exposed to the action of dust devils. The author discusses the causes of dust devils. *Subject Headings:* **1. Historical climates 2. Dust devils 3. Thessalonike, Greece.**—*I.L.D.*

BIOGRAPHY

9.6–54 551.5:92

Steinhauser, F., [**Obituary of**] **Heinrich Ficker.** *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. A*, Vienna, 10(2/3):257–264, **1957.** photo. **DWB, DLC**—The academic career and scientific achievements of Heinrich Ficker (1881–1957) are summarized. He began his scientific work with his studies on föhn winds carried out under the influence of Trobert Ficker; he was the first to establish a micro-climate network in Austria, and in his studies he showed the method of detailed investigations of individual phenomena and generalizing from such studies rather than from means of observations and mathematical theoretical deductions. His contributions include, in addition to his classic studies on föhn winds, the mechanism of cold air incursions into the Alpine region; establishment of the front concept (without using the term "front") before V. Bjerknes' development of depression; the role of tropospheric and lower stratosphere pressure changes upon barometric pressure at any point, etc.; and studies on the meteorology of Turkestan, the climatology of Austria, etc. *Subject Headings:* **1. Obituaries 2. Ficker, H.**—*I.L.D.*

9.6–55 551.5:92

Dines, J. S., [**Obituary note on**] **R. G. K. Lempfert.** *Royal Meteorological Society, Quarterly Journal*, 84(359):87, Jan. **1958. DLC**—A Fellow of the Royal Meteorological Society 1904–57, Rudolf Gustav Karl Lempfert died on 24 June 1957. He was born at Manchester 7 Oct. 1875. Worked under Sir Napier Shaw at Cavendish Laboratory, taught at Rugby, became personal assistant to Shaw when he became Meteorological Office head in 1902. Closely associated with Shaw until he died in 1945. Lempfert was Supt. of Instruments 1905, Statistics 1906, Forecasting 1910, Asst. Director after WWI until retirement 1938. President of R.M.S. 1930–31. Published many papers on synoptic meteorology and a few books, including **Selected Papers of Sir Napier Shaw.** *Subject Headings:* **1. Obituary of R. G. K. Lempfert. I. Lempfert, R. G. K.**—*M.R.*

9.6–56 5:061.1(73)

Science Foundation appoints Gray director government Research Information. *Optical Society of America, Journal*, 46(4):305, April **1956. DWB, DLC**—Coming from Library of Congress where he was Chief of Technical Information Division and Science Division for 5 years—previously at Johns Hopkins Applied Physics Laboratory (1945–50) and editor at Harvard (1943–45) of Underwater Sound Lab. Reports—directed Physics Abstracting study for AIP, 1948–49—author of a textbook in physical sciences, etc. *Subject Headings:* **1. National Science Foundation. 2. Gray, Dwight.**—*M.R.*

9.6–57 626:92

Orlov, B. P., [**Biographical sketch of**] **Evgeniĭ Varfolomeevich Blizniak.** *Meteorologiia i Gidrologiia*, No. 9:64–67, Sept. **1956. DWB, DLC**—This biographical account is published

on the occasion of his 75th birthday and on the 50th anniversary of his scientific and technical activity. The work is in the field of hydraulics and engineering hydrology and he has taken a leading role in the construction and direction of some of the present hydroelectric development of the U.S.S.R. *Subject Headings:* **1. Blizniak, E. V. 2. Hydraulic engineering.**—*I.L.D.*

BIBLIOGRAPHY

See also: **Serials publications and Russian translations**, 9.6–15; **Canada Met. Div. Circulars**, 9.6–42.

9.6–58 551.5:017(02)

†U. S. Air Weather Service, **Books approved for procurement for use of Air Weather Service Units and detachments.** Its *AWS Regulation*, No. 5/13, Feb. 17, **1956.** 19 p. **DWB**—A list of technical (27), popular (12) and aviation (1) meteorology books published since 1941, plus 9 in climatology, 3 in hydrology, 3 in oceanography, 3 in astronomy, 1 in navigation, 2 in hydrodynamics, 8 in geography, 11 in physics, 4 in chemistry, 14 in radio and electrical engineering, 22 in mathematics, 8 in statistics and 5 dictionaries, recommended for use at Air Weather Service stations, plus a tabular list of all 133 books and the class of Air Weather Service Station for which each would be suitable. *Subject Headings:* **1. Meteorology textbooks 2. Publication lists.**—*M.R.*

9.6–59 551.501.4:681.14:016

Heumann, Karl F. (*Chemical Abstracts Service, Ohio State Univ.*), **Data processing for scientists.** *Science*, Wash., D. C., 124(3226):773–777, Oct. 26, **1956.** 3 figs. (incl. photos), 30 refs. **DLC**—A stimulating review of integrated and electronic data processing (IDP and EDP) as used in business, with suggestions for use in scientific data control and publication, and in bibliographic storage, searching, indexing, etc. Matters of coding, classification and processing by 5 channel punched tape, cards, magnetic tape, IBM705 EDPM; UNIVAC and direct input from typewriters or instruments to the processing machines are discussed and illustrated. *Subject Headings:* **1. Electronic data processing 2. Bibliographic searching and indexing 3. Rapid selection.**—*M.R.*

9.6–60 016:91 551.5:016

†Leszczycki, Stanisław and Winid, Bogodar, **Bibliografia geografii Polskiej, 1945–1951.** [Bibliography of Polish geography, 1945–1951.] Warsaw, Pánstwowe Wydawnictwo Naukowe, **1956.** 219 p. 3253 items. Russian and English summaries p. 17–24.—In this non-annotated bibliography of Polish work in geography during 1945–51, references on hydrography and oceanography are found on p. 94–100, and on meteorology and climatology on p. 100–109. All told, there are 340 items (arranged alphabetically by author), plus about 100 cross references to other sections of this volume. Reviews of other work in the field are included, but are placed in small type. The quality of the bibliographical work is very high. *Subject Headings:* **1. Bibliography on geography 2. Bibliography of Polish meteorological literature.**—*M.R.*

PRACTICAL AND APPLIED METEOROLOGY

MARINE METEOROLOGY AND OCEANOGRAPHY

See also: **Hydrochemistry** (Alekin), 9.6–9; **Geophysical studies, Arctic Ocean** (Crary, Goldstein), 9.6–23; **Evaporimeters** (Fedorova, Konstantinov), 9.6–115; **Wind effects on river discharge** (Schmitz), 9.6–192; **Statics and dynamics, Atlantic Ocean** (Wüst), 9F–188; special bibliography on **Dynamic and Physical Oceanography**, p. 731.

9.6–61 551.46

Udintsev, G. B. and Lisitsyn, A. P., **Maksimal'naia glubina okeana.** [Maximum depth of the ocean.] *Priroda*, Moscow, 4:99–101, April, **1953.** 2 figs., 3 refs. **DLC**—This is a historical outline of methods and processes used for the measurement of greatest depths of the oceans of the world as well as the results obtained by expeditions of various countries. It

shows that extensive utilization of modern means of measurement of sea depth have revealed a complex and multiform picture of the underwater relief which, by its scope and the variety of its forms, is not inferior to the relief of the dry land. The last measurements carried out in 1951 by the English hydrographic ship "Challenger" with aid of a perfected ultrasonic depth finder have found that the maximum depth of the Mariana depression is 10,863 m and exceeds thus the maximum depth of the Philippine depression by 323 m. *Subject Heading:* **1. Ocean depths.**—*A.M.P.*

9.6–62 551.464:576.8

Kitamura, H., **The microbes in the standard sea water, Pt. 1.** *Journal of Meteorological Research*, Tokyo, 4(11):933–935, Feb. **1953.** 3 figs., 3 refs. In Japanese; English summary p. 57–58. **MH-BH**—Photographs of bacteria ×80 and 480 are reproduced and their nature discussed. *Subject Heading:* **1. Marine biology.**—*C.E.P.B.*

9.6–63 551.507.2(261)

I.U.G.G. Association of Physical Oceanography, Rome, 1954, **Report of the Committee on Oceanographical Observations from Atlantic Weather Ships.** J. R. Lumby, chairman. Its *Procès-Verbaux*, pub. Bergen, **1954.** p. 98–99. **DWB**—A report of the Committee to the Conference of I.C.A.O. held in Feb. 1954, in Paris, on the work undertaken in the past 3 yrs by ocean weather ships in the North Atlantic, and some recommendations of the Committee concerning the future program of observations; the IGY; the establishment of a central collection of observation records at the U. S. Hydrographic Office, and the organization of marine biological observations. *Subject Headings:* **1. North Atlantic weather stations 2. Weather ships 3. North Atlantic. I. Lumby, J. R.**—*A.M.P.*

9.6–64 551.5:061(26)(09)

Williams, C. H., **The growth of meteorological services for seamen.** *Marine Observer*, 25(169):141–143, July **1955. DLC**—History of gale warnings to ports, marine charts, radio services, etc. *Subject Headings:* **1. Marine meteorological services 2. History of meteorology.**—*C.E.P.B.*

9.6–65 551.507.2(261)

Floating weather stations in the North Atlantic. *Polar Record*, 7(51):512–514, Sept. **1955.** map. **DLC**—Summaries of agreements from 1946–1954, with map of weather ship positions in 1954. *Subject Headings:* **1. Weather ships. 2. North Atlantic.**—*C.E.P.B.*

9.6–66 551.507.2(261)

Bartnicki, L., **Statki-stacje meteorologiczne na północnym Atlantyku.** [Weather ships in the North Atlantic.] *Przegląd Meteorologiczny i Hydrologiczny*, Warsaw, 7(1/2):77–79, **1954.** map. **DWB, DLC**—An historical outline of the gradual development of weather observations in the open sea, carried out casually at first by navigating ships, later by special ships such as "Jacques Cartier" (sponsored by the French Meteorological Service in 1920) and, finally, by a network of ocean weather ships in the North Atlantic in accordance with the resolution of the Meteorological Committee of ICAO made in March 1948 at Dublin. The program of daily observations on each of the 9 stations located in the North Atlantic, operated by 21 ships relaying data to one another, is outlined and their location in the ocean is sketched. *Subject Headings:* **1. Weather ships 2. North Atlantic.**—*A.M.P.*

9.6–67 551.507.2(09) 551.46(09)

Hull, Blanch Brandon (*U. S. Navy Hydrographic Office*), **History of meteorological and oceanographic observations at North Atlantic and North Pacific Ocean stations, 1945–1950.** [Paper] presented at the 115th National Meeting of the American Meteorological Society, Washington, D. C., May 6–8, **1952.** unpaged [55 p.]. 6 tables, 3 figs., 13 refs. **DWB** (M07.2 H913h)—U. S. North Atlantic ship stations have been transmitting surface and upper-air weather observations to the Weather Bureau at Wash., D. C., since 1940. The North Pacific Ocean stations transmit their reports to San Francisco. Prior to 1945, ship locations were frequently changed and the schedules for weather patrols often interrupted by war-

time emergencies. Weather and bathythermograph records for uninterrupted intervals are therefore available only for the years since 1945. This paper shows the intervals that U. S. Coast Guard, Navy, and foreign ships, designated by name or number, were actually on fixed station, taking weather and oceanographic observations. On-station and off-station schedules are presented, together with a brief history of ship patrol. The observations referred to consist of surface, pilot balloon and radiosonde weather reports and bathythermograph traces. Charts of the oceans are included, showing locations and changes of locations of the ocean vessel stations. Tables show the intervals during which the stations were manned. The charts and tables are designed to enable researchers to acquire basic material for the study of weather at a fixed location on the ocean. They make possible the use of punched card data, now identified in the decks by Marsden or one-degree ocean squares. With the definite cataloging of weather observations at fixed locations, comparisons of "fixed" and "moving" weather (as represented by observations from cruising ships) can be determined. *Subject Headings:* **1. History of weather ships 2. History of oceanographic observations 3. Punched card programs 4. North Atlantic 5. North Pacific.**—*Author's abstract.*

ASTRONAUTICS—SATELLITE OBSERVATORIES

9.6–68 551.507.362.2:629.19

Kaplan, Joseph and Hagen, John P., **The satellite: What it is, how it works, what it may bring.** *U. S. News & World Report,* 43(16):106–109, Oct. 18, **1957.** ports. **DLC**—An interview with JOSEPH KAPLAN, chairman of the U. S. National Committee for IGY, giving his views on the Soviet satellite and its importance and on possibilities for space travel. JOHN P. HAGEN, director of Project Vanguard, tells of the advantages of sending a rocket to the moon, and of what the U. S. hopes to learn from our satellites. *Subject Headings:* **1. Soviet satellites 2. Moon rocket 3. Satellite observatories.**—*M.R.*

9.6–69 551.507.362.2

§Wexler, Harry, **The satellite and meteorology.** *Journal of Astronautics,* N. Y., 4(1):5, 8, **1957.** 8 figs., 4 refs. **DLC**—Actual photographs of storm and of cloud areas obtained over the Southwest from rockets at heights of about 100 mi in 1947 and 1954 are reproduced and discussed along with the synoptic charts for Oct. 5, 1954, the day the unsuspected tropical storms were identified from the rocket photographs. Other advantages of pole-to-pole satellite observations or photographs from heights of 4000 mi—a model of how the Western Hemisphere would look from such a height (shown in black and white on cover of journal), albedo and radiation balance measurements—are outlined. *Subject Headings:* **1. Satellite observation 2. Rocket observations 3. Storm photographs.**—*M.R.*

9.6–70 551.507.362.2:629.19

Van Allen, James A., **The artificial satellite as a research instrument.** *Scientific American,* N. Y., 195(5):41–47, Nov. **1956.** 7 figs., 2 photos. **DWB, DLC**—The purpose, design, orbit, observation, control, instrumentation, network of tracking and the relay of information from the earth satellite, scheduled to be launched early in 1958 (during IGY, 12 attempts are to be made, hoping one or more will be successful), are clearly described and nicely illustrated in this popular scientific article. *Subject Headings:* **1. Satellites 2. IGY satellite program.** —*M.R.*

9.6–71 551.507.362.2:629.19:535.3

Zirker, J. B.; Whipple, F. L. and Davis, R. J. (*all, Harvard College Observatory*), **Time available for the optical observation of an earth satellite.** (In: Van Allen, James A. (*ed.*), **Scientific uses of earth satellites.** Ann Arbor, Univ. of Michigan Press, **1956.** p. 23–28. 2 figs., ref., 14 eqs.) **DWB, DLC?**—Light curves during a twilight observation of a satellite are computed for specularly reflecting and for diffusely reflecting spheres of 20-in. diameter. The specular reflector is visible over a larger fraction of its path. The time available for observation of a specular reflector is computed for several cases. Sky brightness, geometry, and the earth's shadow are factors in the calculation. If the satellite circles 200 mi above the earth's equator, maximum observation time (about 160 sec) is obtained with the observer

situated at the equator. The observation time is insensitive to the angle of the sun below the horizon in the range from 5° to 15°. Observers situated at latitudes as high as ±5° would have only 30 sec in which to detect the satellite. *Subject Heading:* **1. Satellite optical observation.**—*Authors' abstract.*

9.6–72 523.5

Singer, S. Fred (*Univ. of Maryland*), **Measurement of interplanetary dust.** (In: Van Allen, James A. (*ed.*), **Scientific uses of earth satellites.** Ann Arbor, Univ. of Michigan Press, **1956.** p. 301–316. 3 figs., 16 refs., 21 eqs.) **DWB, DLC**—A simple theory is developed for the motion of charged interplanetary dust particles in the vicinity of the earth. We take up: 1) The average charge of dust particles; 2) Day-night effect; 3) Solar-flare effects; 4) The resultant rigidity spectrum; 5) Motion in the geomagnetic and gravitational field; LIOUVILLE's theorem; 6) Trapped orbits and storage of particles; 7) Streams and impact zones; 8) Magnetic-storm effects. These considerations are then applied to possible experimental tests in rockets or satellites: 1) Dependence of dust-particle flux on geomagnetic lat.; 2) Geophysical implications of lat. dependence; 3) Diurnal variation of intensity; 4) Electromagnetic conditions in the vicinity of the earth; variation of particle flux and anisotropy. Some suggestions are made for resolving the discrepancy between meteor data and optical measurements of interplanetary dust-particle densities. The problem of dust-particle accretion is briefly considered. *Subject Heading:* **1. Interplanetary dust.**—*Author's abstract.*

AERONAUTICAL METEOROLOGY

9.6–73 551.5:629.13

International Air Transport Association (IATA), Montreal, **Long distance flights: a condensed record of discussions of Operational Problems of Long Distance Flights,** held during the 8th Annual Technical Conference of IATA, Puerto Rico, April–May **1955.** Its *Document General,* 1537, pub. Montreal by IATA. 127 p. figs. **DWB** (629.18 I61L)—The meteorological requirements for long distance flight are discussed on p. 37–45 (reports on winds at high altitudes, icing, aerodome forecasts, alternate field forecasts, airborne weather radar, etc.). The appendix contains a thorough discussion of the jet stream and its operational significance, also minimum flight path techniques, "project tailwind," en-route weather reports, improved forecasting and reporting of upper winds and temperatures and the quantitative evaluation of these last 2 factors in terms of pay-loads or distance of flight, etc. for high altitude, high-speed planes. *Subject Headings:* **1. Meteorological factors in long distance flight 2. Aeronautical meteorology 3. Jet stream flying.**—*M.R.*

9.6–74 551.589.5:656.71

Muttit, G. H., **Some aspects of ceilings and visibilities in snow at Goose Bay, Lab.** *Canada. Meteorological Div., CIR.* 2781, *TEC.* 232, May 9, **1956.** 8 p. 2 figs., 3 tables, 2 refs. **DLC**—Tables show frequency of simultaneous ceiling and visibility categories at Goose Bay, Labrador, for Nov.–March, 1945-53, in all cases, and in cases with cloud and snow, and with snow ceilings alone. Graphs show number of hours and frequency of ceiling from 0–4000 ft (according to 5 categories) and visibility 0–4 mi (8 categories). Data are from hourly observations. It is concluded that ceilings <1000 ft and visibility <1 mi are almost certain whenever snow occurs. *Subject Headings:* **1. Ceiling and visibility frequencies 2. Snow ceilings 3. Goose Bay, Labrador.**—*M.R.*

9.6–75 551.578.11:629.13

Hacker, Paul T.; Brun, Rinaldo J. and Boyd, Bemrose, **Impingement of droplets in 90° elbows with potential flow.** *U. S. NACA, Technical Note,* No. 2999, Sept. **1953.** 58 p. 14 figs., 2 tables, 14 refs. **DWB**—Trajectories were determined for droplets in air flowing through 90° elbows especially designed for two-dimensional potential motion with low pressure losses. The elbows were established by selecting as walls of each elbow two streamlines of the flow field produced by a complex potential function that establishes a two-dimensional flow around a 90° bend. An unlimited number of elbows with slightly different shapes can be established by selecting different pairs of streamlines as walls. The elbows produced by the complex

potential function selected are suitable for use in aircraft air-intake ducts. The droplet impingement data derived from the trajectories are presented, along with equations, in such a manner that the collection efficiency, the area, the rate, and the distribution of droplet impingement can be determined for any elbow defined by any pair of streamlines within a portion of the flow field established by the complex potential function. Coordinates for some typical streamlines of the flow field and velocity components for several points along these streamlines are presented in tabular form. *Subject Heading:* **1. Impingement of drops.**—*Authors' abstract.*

9.6–76 629.13:551.574.1

Bowden, Dean T., **Investigation of porous gas-heated leading-edge section for icing protection of a delta wing.** *U. S. National Advisory Committee for Aeronautics, Research Memorandum*, No. RM E54I03, Jan. 19, **1955.** 54 p. 22 figs., table, 15 refs. **DWB** (629.1308 U585rm)—Satisfactory testing of an anti-icing system under a large variety of icing conditions is reported. The graphs presented include effects of air temperature and liquid water content on the device's performance. *Subject Headings:* **1. De-icing of aircraft 2. Icing prevention.**—*G.T.*

9.6–77 629.12:551.510.53:551.551.5

Timofeev, D. [P.], **Meteorologicheskie usloviia poletov na bol'shikh vysotakh.** [Meteorological conditions for flight at high altitudes.] *Grazhdanskaia Aviatsiia*, Moscow, 13(8):14–16, April **1956.** photo. **DLC**—A general summary of present knowledge of the jet stream, high altitude turbulence, the tropopause, cirrus clouds, visibility and related atmospheric conditions affecting high altitude flying. The strength of the jet stream was said to be 300–350 km/hr in the Far East and Kamchatka in 1955–56, and 290–325 km/hr in Western Siberia, Kazakhstan and Central Asia, but 300–390 km/hr in Japan, and in America >400 km/hr. *Subject Headings:* **1. High altitude flying conditions 2. High level turbulence 3. Jet stream 4. Asia.**—*M.R.*

AGRICULTURAL METEOROLOGY

See also: **Dew measurement** (Iowa St. College), 9.6–205; **Climatic changes and drought, S.W. Africa** (Walter), 9.6–242; **Ranching climate, Brit. Columbia Plateau** (Weir), 9.6–243; **Soil climatology, U.S.S.R.** (von Poletika), 9.6–250.

9.6–78 551.586:633.18(521.41)

Nakada, Y., **Relationship between the rice crop and climatic factors in Niigata Prefecture.** *Journal of Meteorological Research*, Tokyo, 9(6):379–393, July **1957.** 7 figs., 5 tables, 6 refs. **DWB**—The amount of rice crop per unit area, koku/tan in Japanese unit nearly equal to 18.2 litre/acre, is increasing year after year generally in our country and also in Niigata Prefecture, owing to the farming improvement. Here this increasing tendency has been investigated first, and divided into four periods since 1905 to 1956. Normal tendency equation has been assigned for each period. Then the relation between the deviation of the amount from the normal of each year and its monthly climatic elements has been discussed in the way of correlation method. Results are as follows: 1) The main factor affecting rice crop is the average air temperature of July to August. 2) Next, the damage from strong wind, flood, drought, virus and insect are important. *Subject Headings:* **1. Agricultural climatology 2. Rice culture 3. Rice yield 4. Niigata Prefecture, Japan.**—*Author's abstract.*

9.6–79 551.5:63

†Ripley, P. O. (*Canada. Dept. of Agri., Ottawa*), **Agricultural meteorology is everybody's business.** *Canadian Society of Agronomy, 2nd Annual Meeting, Univ. of Toronto, June 25–28, 1956*, **Proceedings,** Sec. C, p. 1–7. 27 refs. **DA?**—A general review of the field of meteorology, bioclimatology, agricultural meteorology, and applications to Canadian weather and climatic conditions and special problems in Canadian agrometeorology. A few notable studies in this field are mentioned (instrumentation, soil-crop meteorology, crop adaptation, field husbandry) and future needs in agrometeorological research in Canada as the frontier moves northward are pointed out. *Subject Headings:* **1. Agricultural meteorology, Canada 2. Canada.**—*M.R.*

9.6–80 551.501.9:63

Savinskiĭ, N .V., **40 let raboty Agrometeorologicheskoĭ Stantsii Sobakino.** [Forty year's work of the Sobakino Agrometeorological Station.] *Meteorologiia i Gidrologiia*, No. 4:68–69, April **1956. DWB, DLC**—The Sobakino Agrometeorological Station is located in the Naro-Fominsk district of Moscow Oblast. Some of the more important studies on microclimatology and agricultural meteorology carried out at this station, since its establishment after the October Revolution, are mentioned. S. I. Nebol'sin studied wind damping by vegetation cover, heat regime of the soil, etc. Studies were carried out on the use of solar energy by plants, influence of wind velocity on transpiration, etc. The names of some of the more important collaborators at this station and their work are cited. *Subject Headings:* **1. Agrometeorological stations 2. Agrometeorological research 3. Sobakino Agrometeorological Station 4. U.S.S.R.**—*I.L.D.*

9.6–81 551.5:63:06

Thran, P., **Tätigkeitsberichte der Agrarmeteorologischen Dienststellen, Schleswig.** [Activity report of the agrometeorological service at Schleswig.] *Germany. Deutscher Wetterdienst, Mitteilungen*, 2(14):84–86, **1955. DWB**—Brief description of the work carried out by the agrometeorological service since 1947 is given. These included studies on the effect of climate upon yields of sugar beets and sugar content, determination of dates for insecticide spraying, etc. No special agrometeorological office exists; the work was done in the synoptic service. *Subject Headings:* **1. Agrometeorological services 2. Climate and crop yield 3. Bonn, Germany.**—*I.L.D.*

FOREST METEOROLOGY

See also: **Summer fog precip.** (Oberlander), 9.6–232.

9.6–82 551.579.5:634.94 551.524.32(713) 551.525.4

*Fraser, Donald A. (*Petawawa Forest Experiment Station, Chalk River, Ontario*), **Tree species in relation to soil moisture sites (Ecological studies of forest trees at Chalk River, Ontario, Canada, Pt. 1).** *Ecology*, Durham, N. C., 35(3):406–414, July **1954.** 3 figs., 4 tables, 15 refs. **Pt. 2, Ecological conditions and radial increment.** *Ibid.*, 37(4):777–789, Oct. **1956.** 5 figs., 5 tables, 28 refs. **DWB, DLC**—In connection with studies of trees and soil moisture, data from the Chalk River weather station (45°58′N, 77°31′W) at the Petawawa Forest Experiment Station, Ontario are summarized (for 1936–50). Temperature ranges from −38.2° to 98.1°F (mean annual 39.4°F). Shortest frost free season is 100 days and average 136 days. Snow covers ground from Nov.–April. Thermal efficiency is 20 in. (potential evapotranspiration) and moisture index is 80 (humid) according to Hare. Local soil moisture variations are shown on map and discussed. Water table fluctuations were measured in three moisture regimes and relation of water table to rainfall or weather analyzed and shown graphically for April–Sept. of each year 1949, 1950, 1951 and 1952. Relation of soil moisture to type of tree is also shown graphically and discussed. Some types have a wide tolerance but nevertheless an optimum moisture regime. In Pt. 2 is a study of the relationship between radial growth of trees and their environment. Contains an account of the annual variations in canopy air and soil temperature, rainfall and soil temperature for three sites on an eight acre plot at Chalk River for the period 1940–1953. Data are presented on the summer march of daily mean air and soil temperatures, number of days with frost in May and number of hours in which soil temperature was below 50°F and summer march of soil moisture in upper 30 in. of soil. Correlations were made between these meteorological elements and the radial growth of 8 forest spruces. *Subject Headings:* **1. Climate of Chalk River, Ontario 2. Rainfall-soil moisture relationships 3. Soil moisture-tree growth relationships 4. Annual temperature variations 5. Soil temperatures 6. Chalk River, Ontario.**—*M.R., I.L.D.*

9.6–83 551.311.31:58

†U. S. Beach Erosion Board, **Dune formation and stabilization by vegetation and plantings.** Its *Technical Memorandum*, No. 101, Oct. **1957.** 47+11 p. 10 figs. (incl. photos), 3 tables, 48 refs. **DWB** (551.46 U582b)—Available plants for dune stabilization in the various climatic

zones are listed and discussed. Climatic regions of the U. S. for dune vegetation are demarcated and discussed. Methods of planting and tending, and performance in outer banks of N. Carolina, Oregon, Long Island and Florida are described and illustrated. *Subject Headings:* **1. Dune stabilization 2. Coastal regions, U. S.**—*M.R.*

INDUSTRIAL METEOROLOGY

See also: **Radiation balance of houses** (Noltage), 9.6–168; **Heat flow through walls** (Akai), 9.6–249.

9.6–84 620.9:551.521.1

†Trombe, Felix, **L'utilisation de l'énergie solaire état actuel et perspectives d'avenir.** [Present status and future perspectives for the utilization of solar energy.] *France. Centre National de la Recherche Scientifique, Journal des Recherches*, No. 25:193–215, Dec. **1953.** 34 figs., bibliog. p. 215. **DLC**—A summary of methods for the utilization of solar energy. The natural utilization proceeds through chlorophyll, the artificial proceeds either without a concentration of the radiation by heating of air through glazings, heating or distillation of water or with a concentration of the radiation, producing direct electricity, building solar refrigerators and furnaces. Modern installations are shown on photos and their working principles are explained in sketches. *Subject Headings:* **1. Solar energy utilization 2. Solar furnaces 3. France.**—*A.A.*

MEDICAL METEOROLOGY

See also: **Air sampling and analysis, ind. indoor air** (Shagan), 9.6–139.

9.6–85 551.586:615.834

Pasic, H. (*Sarajevo*), **Mikroklimatische Untersuchungen im Kurort Srebrenica (Ostbosnien).** [Microclimatic research in the health resort Srebrenica, East Bosnia.] *Wetter und Leben*, Vienna, 7(8/11):281–282, **1955. DLC**—The location and the mineral springs of the health resort are described, and the observations carried out at a second order station are listed. Temperature and relative humidity were measured at 0, 5, 20, 100 and 200 cm and wind at 100 and 200 cm. A brief description is given of the temperature and humidity characteristics of temperature inversions and of air pollution conditions. *Subject Headings:* **1. Resort climatology 2. Microclimatic data 3. Srebrenica, Yugoslavia.**—*I.L.D.*

9.6–86 697.2:351.662.613

Branson, W. R., **The application of the Clean Air Act to private dwellings.** *Smokeless Air*, No. 102:269–273, Summer **1957. DWB**—Discusses availability of coke. One-third of bituminous coal now used in black areas of W. Midlands could be replaced by gas coke in the next 5 yrs. Special fuels cost 30–40 sh. a ton more than normal gas coke. *Subject Headings:* **1. Heating of houses 2. Coke 3. Clean Air Act.**—*C.E.P.B.*

9.6–87 551.508:615.834

Undt, W. (*Vienna*), **Die praktische Zusammenarbeit bei der Erforschung des Heilklimas.** [Practical cooperation in research on health climate.] *Wetter und Leben*, Vienna, 7(8/11):279–280, **1955.** 3 refs. **DLC**—The author lists the instruments necessary for obtaining data necessary for climatic health resorts (frigorigraphs, actinometers, ion counters, instrument for radioactive measurements, etc.) and outlines the meteorological and medical activities to be carried out at a health resort and discusses the aspects of their cooperation. *Subject Headings:* **1. Health resorts 2. Meteorological instruments.**—*I.L.D.*

9.6–88 551.510.42:612

Borisova, M. K., **Eksperimental'nye materialy k ustanovleniiu predel'no dopustimoĭ kontsentratsii dikhloretana v atmosfernom vozdukhe.** [Experimental data on the determination of the maximum permissible concentration of dichlorethane in the atmosphere.] *Gigiena i Sanitariia*, Moscow, 22(3):13–19, March **1957.** 4 figs., 4 tables, 6 refs. **DLC**—The concentration of fumes of dichlorethane by the microprecipitation method ranged from 3.5 to 38.6 mg

per cubic meter of air within a radius of 200 m from the source of discharge. The olfactory threshold concentrations of dichlorethane, as determined for 23 persons, was 23.3 mg/M³. Persons with a more acute sense of smell became aware of dichlorethane at a concentration of 17.5 mg/M³. Fumes of dichlorethane at concentrations of 5 to 50 mg/M³ reduce the light sensitivity of the eyes as the concentration increases. Plethysmographic concentrations indicate that vasoconcentration increases as concentrations of dichlorethane increase. Steorographic studies show that the dichlorethane concentrations produce a reflex change of rate, depth and rhythm of respiration. The maximum permissible concentration of dichlorethane in the atmosphere at any one time should not exceed 4 mg/M³. Numerical and graphical data are presented. *Subject Headings:* **1. Atmospheric pollution effects 2. Dichlorethane 3. Public health.**—*Author's abstract and I.L.D.*

9.6–89 551.508.91 551.5:581.16

Dingle, A. Nelson (*Met. Lab., Univ. of Mich.*), **Hay fever pollen counts and some weather effects.** *American Meteorological Society, Bulletin*, 38(8):465–469, Oct. **1957.** 2 figs., 32 refs. **DWB**—The standard gravity slide method of obtaining hay fever pollen counts is examined in relation to the volumetric method. Scrutiny of calibration data in the light of weather information reveals three interesting weather-related sequences of pollen concentrations. The gravity slide counts appear to represent the pollen concentrations quite poorly. *Subject Headings:* **1. Pollen counting techniques 2. Weather effects on pollen count.**—*Author's abstract.*

METEOROLOGICAL OBSERVATIONS AND INSTRUMENTS

METHODS OF OBSERVATION

See also: **Topographic surveying manual** (Dobrokhotov), 9.6–20; **Kiev Geophys. Obs.** (Prikhot'ko), 9.6–46; **Electronic data processing and bibliog. indexing** (Heumann), 9.6–59; **Agromet. stations, Sobakino, U.S.S.R.,** (Savinskiĭ), 9.6–80; **Weather broadcasting, U.S.S.R.,** (Hegyi), 9.6–122; **Ice crystal growth and radar snow obs.** (Douglas), 9.6–226; **Snow crystal aerology** (Weickmann), 9.6–227; **Snow surveys, Japan** (Ishiwara et al.), 9.6–228.

9.6–90 551.501.7(09)

Little, D. M. (*Deputy Chief, U. S. W. B., Wash., D. C.*), **The Weather man's struggle for upper-air data.** *Sperryscope*, N. Y., 14(3):6–9, **1956.** port., photos. **DWB**—A broad historical and factual perspective of the development of improved methods of upper air sounding is presented in this well illustrated article. Beginning with kites, manned and unmanned sounding balloons, meteorograph (balloon, kite and aeroplane) and radio soundings, jet plane, rocket and indirect (acoustical, searchlight, radio propagation) radioactive tracers, transosondes, automatic computers, radar tracking, and finally the artificial satellite are considered as aids to better knowledge and ultimately better forecasts of the atmosphere and weather. *Subject Headings:* **1. Upper air sounding techniques 2. History of upper air sounding.**—*M.R.*

9.6–91 551.577:551.501.8

Cena, G., **Radar e fenomeni meteorologici, in particolare turbolenza e grandine.** [Radar and meteorological phenomena, especially turbulence and hail.] *Rivista di Meteorologia Aeronautica*, Rome, 17(3):10–14, July/Sept. **1957.** 9 refs. French, English and German summaries p. 10. **DLC**—The forms of radar-screen pictures associated with atmospheric phenomena are described in detail. Among the phenomena discussed as to their appearance on the radar screen are convective precipitation, precipitation from stratiform clouds, wind shear, upper-air precipitation and wind, snow, icing level, fronts, convective cells, hurricanes and, in particular detail, turbulence and hail. *Subject Headings:* **1. Radar observation 2. Radar precipitation echoes 3. Radar echoes from hail 4. Radar echoes from turbulence.**—*G.T.*

9.6–92 551.501.8:551.509.54:551.577:551.515.4

Otsuka, R., **A case study on the practical application of radar echoes to the forecasting of local heavy rain associated with thunderstorm.** *Journal of Meteorological Research*, Tokyo, 9(7):519–523, July **1957.** 16 figs., 7 refs. In Japanese, English summary p. 519. **DWB, DLC**—The Kanto district thunderstorm of September 12, 1956 was an outstanding example of small-area rainstorm. The short-range forecast prepared for this day failed, but a timely thunderstorm advisory was given by radar echo analysis. In this report the author described the analysis of weather condition and radar echoes (Figs. 1–16). *Subject Headings:* **1. Radar echoes from thunderstorms 2. Radar rain forecasting 3. Radar precipitation echoes 4. Kanto District, Japan.**—*Author's abstract.*

9.6–93 551.501.81:551.577:551.574.1

Atlas, David (*Geophy. Res. Dir., Res. Center, Cambridge, Mass.*), **Radar measurements of precipitation growth.** (In: Conference on the Physics of Cloud and Precipitation Particles, Sept. 1955, **Proceedings.** pub. N. Y. Pergamon Press, **1957.** p. 288–305. 9 figs., 1 table, 5 refs.) **DLC** (QC921.5.U5), **DWB**—Quantitative radar measurements of the growth of precipitation and aircraft cloud observations are considered in the light of existing theories of growth and moisture supply. In two cases of stratiform precipitation, the number concentration of ice crystals released from the generating elements differed greatly; 470 m^{-3} were computed in the last streamer associated with a weak cyclone passing far to the south, while 15,000 m^{-3} were estimated in the active forward central region of an intense cyclone. In both cases the crystal growth proceeded at rates corresponding closely to a water-saturated environment, and in reasonably good accord with HOUGHTON's theoretical values. However, the smaller crystal concentration in the weaker storm permitted the coexistence of a water cloud, while the higher concentration of the more intense one prevented cloud formation, Although 1 cm radar measurements are subject to question in the melting layer, they suggest, nevertheless, that this region is one of major growth when active cloud masses are present. This indication is strongly supported in one instance by independent meteorological observations showing the rapid depletion of a dense cloud as it rises to the 0°C level. The estimated rates of growth are consistent with the growth of a large melting particle by accretion of cloud droplets. Growth of the raindrops below proceeds at a reduced rate both because of the lower cloud water contents and the smaller collection areas. Thus, while the rain may be inadequate to remove the excess cloud formed in the lower levels, the melting snow may do the job quite well. *Subject Headings:* **1. Radar precipitation measurement 2. Precipitation formation.** —*Author's abstract.*

9.6–94 551.501.81:551.578.11

Austin, Pauline M. and Wexler, Raymond (*Weather Radar Res., Dept. of Met., Mass. Inst. of Tech., Cambridge, Mass.*), **Observations of space and time variations in the radar echo intensity of showers.** (In: Conference on the Physics of Cloud and Precipitation Particles, Sept. 1955, **Proceedings.** pub. N. Y. Pergamon Press, **1957.** p. 271–276. 2 figs., 5 refs.) **DLC** (QC921.5.U5), **DWB.** Also issued as *Weather Radar Conference, Sept. 1955, Proceedings of the 5th Conference*, p. 309–313, pub. **1956.** 2 figs., 5 refs. **DWB**—Since the intensity of the radar signal from precipitation is extremely sensitive to the size and composition of the particles and reasonably sensitive to the particle concentration, detailed measurements of the signal intensity from various regions within storm areas yield information concerning both the growth and development of the precipitation particles and the small-scale atmospheric motions. A technique for making measurements of the time and space variations of the radar signal intensity from convective showers is described and examples of the data are presented. Observations of eleven convective showers on nine days indicate the following general pattern of development: In the early stages the shower consists of a single cell with a narrow intense core. There is a tendency for several turrets to develop at the top of the cell which subsequently weakens in intensity and becomes broader and irregular in shape. Finally, it often resolves itself into several small separate cells which may be only a few tenths of a mile in horizontal dimensions while the spaces between them are of the same order of magnitude. *Subject Headings:* **1. Radar rainfall intensity studies 2. Shower conditions.**—*Authors' abstract.*

9.6–95 551.501.81:551.578.7

Cook, Billie J. (*Radar Analysis and Dev. Unit, W. B. Forecast Center, Kansas City, Mo.*), **Determination of hail by Weather Bureau search radar.** Paper presented at the 6th Weather Radar Conference, Cambridge, Mass., March 26–28, 1957. Wash., D. C., U. S. Weather Bureau, April 15, 1957. 7 p. 4 figs., table. Mimeo. DWB (M01.81 U587d). Also in *Weather Radar Conference, 6th, Cambridge, Mass., March 26–28, 1957, Proceedings*, pub. 1957. p. 127–133. 4 figs. DWB (M01.81 R124pc)—During the 4 months of April–June 1956, the radar and hail reports around 17 Weather Bureau radar stations in the midwest were correlated. It was found that at ranges of $\geqslant 120$ nautical mi $>50\%$ of the echoes received were from hail, and that the percent of hail echoes increases with increased distance from the radar. The hail data were obtained from hail claims in the vicinity of the radar stations, which ranged from S. Dakota and Iowa to Texas. *Subject Headings:* **1. Radar hail detection 2. Radar-hail correlations 3. Midwest U. S.**—*M.R.*

9.6–96 551.501.89:551.515.2

Fletcher, R. D. (*Air Weather Service, U. S. A. F.*), **Aircraft reconnaissance of tropical cyclones by the Air Weather Service.** (In: Tropical Cyclone Symposium, Brisbane, Dec. 1956, **Proceedings.** Pub. Dec. 1956. p. 371–377.) DWB—History of airplane hurricane reconnaissance since 1943, types of aircraft used, present and future equipment, reconnaissance tracks and procedures, communications and research reconnaissance activities of the U. S. Air Force, are summarized in this factual article. *Subject Headings:* **1. Aircraft hurricane reconnaissance 2. Hurricane reconnaissance.**—*M.R.*

9.6–97 551.501.81:551.578.4

Imai, I.; Fujiwara, M.; Ichimura, I. and Toyama, Y. (*all, Met. Res. Inst.*), **Radar reflectivity of falling snow.** *Papers in Meteorology and Geophysics*, Tokyo, 6(2):130–139, Sept. 1955. 14 figs. (incl. photos), 11 refs., 6 eqs. DWB—To investigate the radar reflectivity of falling snow, a continuous observation of size distributions of snow particles was made. The fall velocity in relation to the melted diameter of snowflakes was studied simultaneously. The results show that a definite relationship between the radar reflectivity Z and the intensity of snowfall R exists for a duration of an hour or so. With the change in the degree of aggregation of snowflakes, an abrupt change of the coefficient occurs. The coefficients are some 3 to 10 times as great as that in MARSHALL's relation. A brief discussion of the observed size-distribution curves is made. *Subject Headings:* **1. Radar analysis of snowfall 2. Radar snowfall observations 3. Radar signal intensity (Z values).**—*Authors' abstract.*

9.6–98 551.501.81:551.578.4

Kodaira, N. and Inaba, M. (*both, Met. Res. Inst.*), **Measurement of snowfall intensity by radar.** *Papers in Meteorology and Geophysics*, Tokyo, 6(2):126–129, Sept. 1955. 5 figs. (incl. photos), table, 4 refs., eq. DWB—In this report the radar snowfall intensity is compared with that obtained from a snowflake sampler and it is shown that the F-factor of 1/8 can be used as in the case of rain measurement. In case the reflectivity factor Z changes rapidly in wide range just like the day of experiment, the measurement of snowfall intensity by radar causes a large error and is very difficult unless Z is obtained directly. *Subject Headings:* **1. Radar snowfall observations 2. Snowfall intensity.**—*Authors' abstract.*

OBSERVATIONAL DATA

See also: **Arctic expeditions** (Bushnell), 9.6–21; **Arctic expeditions** (Caswell), 9.6–22; **Soviet Arctic expeditions** (Schmidt), 9.6–24; **Soviet participation in IGY** (Petrov), 9.6–29; **Sci. problems of Antarctic** (Shcherbakov), 9.6–31; **IGY met. program** (Hewson), 9.6–32; **IGY program** (Hulburt), 9.6–33; **IGY networks,** 9.6–34; **Norwegian participation in IGY,** 9.6–35; **IGY networks** (Vassy), 9.6–36; **IGY program** (Wendt), 9.6–37; **Television weather addresses** (Wexler), 9.6–38; **IGY seminars** (Taylor), 9.6–49.

9.6–99 551.506.1(713)

*Canada. Meteorological Div., **Annual meteorological summary, Fort William, Ont., 1955.** [1956] 24 p. mostly tables. DWB—Standard tables of daily monthly and annual

data for 1955 for Fort William, Ont. (lat. 48°22′, long. 89°19′, elev. 64 ft) with verbal summary of weather conditions for each month, and supplementary tables giving daily and monthly and annual means, totals, or extremes for period 1883–1955 for temp., precip., and snow. Highest temp. on record 104° in 1936, lowest temp. on record, −42°F in Jan. 1951, heaviest snow (since 1932–3) 149″ in 1936–7 (666″ in Jan. and 43.6″ in Feb. 1937). *Subject Headings:* **1. Annual meteorological data summaries 2. Fort William, Ontario.**—*M.R.*

9.6–100 551.506.1(85)

*Garcia, Manuel, [**Letters written 1872.**] *Revista Meteorológica del Perú*, Lima, 2(3):58, Oct./Dec. **1956.** table. **DWB**—Copies of 3 letters from MANUEL GARCIA, giving notes and data on pressure, temperature, wet bulb, sky and minimum temperature for 1:30 p.m. each day of March 24–31, 1872 at Ocucaje, Peru. *Subject Headings:* **1. Manuscript observational data 2. Ocucaje, Peru.**—*M.R.*

9.6–101 551.506.1(438)

*Kosiba, Aleksander, **Obserwacje dobowe we Wrocławia, 1951, 1952, 1953, 1954, 1955 [and] Klimat Wrocławia w 1951, 1952, 1953, 1954 r.** [Daily observations in Wrocław, 1951, 1952, 1953, 1954, 1955 [and] Climate of Wrocław in 1951, 1952, 1953, 1954, 1955.] *Wrocław. Observatorium Meteorologii i Klimatologii, Prace*, No. 6–10, 1951–1955. pub. **1956** and **1957.** Each about 52 p. tables, figs., refs. English summaries. T-p. and legends in Polish and English. **DWB** (M06.1/438 B842p)—Monthly tables give daily and monthly data for the usual elements observed at synoptic stations (07, 13 and 21 h) plus sunshine. Detailed summaries and analyses of weather during the year are provided. Various climatological features are discussed. (*See* 5.1–39 *MAB* for 1950 **Observations,** and 5.6–250 *MAB* for **Climate of Wroclaw,** 1946–1950.) *Subject Headings:* **1. Annual meteorological data summaries 2. Cold winters 3. Solar-weather relationships 4. Wrocław, Poland.**—*M.R.*

9.6–102 551.506.1(611)

*Tunis. Service Météorologique, **Bulletin annuel** [Annual bulletin], **1952 and 1953.** Issued Tunis, **1956?** about 150 p. each. almost entirely tables. **DWB** (M06.1/611 T926a)—Data for 54 stations included, in addition to usual elements, 6 h, 12 h and 18 h data on cloud cover, ceiling, visibility, relative humidity, pressure, evaporation, sunshine duration, vapor pressure, wind speed, etc. where available. Monthly wind direction and velocity frequencies are given for 15 stations and daily rainfall amounts for all stations. "Wind energy" data are given for 5 stations. *Subject Headings:* **1. Annual meteorological data summaries 2. Tunisia.**—*M.R.*

9.6–103 551.506.3(54)

*Kolar Gold Field, Oorgaum, Mysore (India). Observatory, **(Observations), 1909–1956.** The K. G. F. Committee, **1957?** 7 p. mostly tables. **DWB** (M06.3/54 K81s, 1909–1956)—Climatic tables based on 47 yrs of data for Oorgaum, Mysore. Besides the table of averages and extremes for the entire period, the 1956 data are presented in a similar table and the frequencies of maximum and minimum dry bulb and maximum and minimum wet bulb temperature in 4 contingency tables (2°F intervals). *Subject Headings:* **1. Climatic data 2. Climate of Oorgaum, Mysore, India 2. Wet bulb temperature frequencies 3. Oorgaum, Mysore, India.**—*M.R.*

9.6–104 551.506.3:551.577:63(54)

*Mann, Harold H., **Rainfall and famine: a study of rainfall in the Bombay Deccan, 1865–1938.** Bombay, Indian Society of Agricultural Economics, **1955.** 47 p. 4 charts, numerous tables. **DLC**—This study begins with a general account of the climate and rainfall conditions of the Poona, Ahmadnagar, Sholapur and Bijapur districts of the Bombay Deccan. This is followed by a discussion of the concepts, maximum effective agricultural rainfall and the quantity of effective rainfall which should fall within each period of 20 days in order to get

fully vigorous growth; an examination of whether a tendency for an increase or decrease in the amount of total rainfall or whether rainfall periodicity is present, whether there has been a consistent or periodic change in the date of beginning or ending of the effective rainfall and of change in the distribution of the effective rainfall in the rainfall season and of the actual changes in the amount of effective rainfall; and an analysis of the relationship of the effective rainfall to the agricultural success of a season, and the relationship of the wetness of the soil to the agricultural success of a season. The appendix contains data on total rainfall, maximum effective rainfall for each year from 1857 to 1938 for each district. *Subject Headings:* **1. Climate of Bombay 2. Rainfall data 3. Effective rainfall 4. Agricultural meteorology 5. Famines 6. Bombay, India.**—*I.L.D.*

9.6–105 551.506.7(87)

Sifontes, Ernesto, **Temperatura y presión atmosféricas en función con la altura.** [Atmospheric temperature and pressure as functions of height.] Caracas, Imprenta Nacional, **1951.** 19 p. photos, tables. At head of t-p: **Notas del trópico. DWB** (M82.1/87 S573t)—Temperature and pressure values obtained during a flight over Venezuela up to 2000 m altitude are given, as well as diary notes concerning clouds and other weather observations. The photographs are travel pictures unrelated to meteorology. *Subject Headings:* **1. Upper air observations 2. Venezuela.**—*G.T.*

9.6–106 551.506.8:551.515.83(47)

Dolgoshov, V. I., **Front oseni.** [Autumn front.] *Priroda*, Moscow, 45(10):127, Oct. **1956. DLC**—The spread of the phenological phenomena during the late fall from east to west in the U.S.S.R. is illustrated by means of a map which shows schematically for Oct. 20 the beginning of a stable snow cover, first temporary snow cover, end of leaf fall for the birch, etc. *Subject Headings:* **1. Phenological observations 2. Frontal movement 3. Snow cover 4. U.S.S.R.**—*I.L.D.*

9.6–107 551.506.8:551.515.83(47)

Dolgoshov, V. I., **Front vesny.** [Spring front.] *Priroda*, Moscow, 45(4):125, April **1956.** fig. **DLC**—The earlier occurrence of spring weather in western, as compared with eastern, Russia at the same lat. and the accompanying passage of a warm front from southwest to northeast are associated with a sequence of phenological phenomena. The appearance of the latter on April 20 is shown on a map. *Subject Headings:* **1. Phenological observations 2. Frontal movement 3. U.S.S.R.**—*I.L.D.*

INSTRUMENT CARRIERS

See also: **IGY networks and rocket research** (Vassy), 9.6–36; **IGY satellite program** (Whipple), 9.6–39; **N. Atlantic weather stations** (I.U.G.G.), 9.6–63; **Atlantic weather ships,** 9.6–65; **Weather ships, N. Atlantic,** (Bartnicki), 9.6–66; **Hist. of weather ships, N. Atlantic and N. Pacific** (Hull), 9.6–67; **Soviet satellites** (Kaplan), 9.6–68; **Satellite observatories** (Wexler), 9.6–69; **Satellites and IGY** (Van Allen), 9.6–70; **Satellite optical obs.** (Zirker et al.), 9.6–71; **Satellite instrumentation and solar stream proton meas.** (Bennett), 9.6–285.

9.6–108 551.507.362.1

Ordway, Frederick I., III, and Wakeford, Ronald C., **1957 research rocket roundup.** *Missiles and Rockets*, Wash., D. C., 2(3):39–48, March **1957.** figs., tables. **DLC**—A perspective of rocket development over the years, from Explorer II balloon ascent days to the present, is shown in a schematic diagram from ground to 300 mi height. The V-2 Viking, WAC Corporal, Aerobee Deacon and Aerobee Hi rockets are described, the number of firings given and resulting knowledge outlined. Finally, the details of rockets being developed—the Iris, Arcon, Terrapin, Rockaire, Rockoon, etc.—specifications of each, the instrumentation for research, IGY plans, a summary of foreign missiles (British, French, Japanese and German) are discussed and illustrated. *Subject Heading:* **1. Rocket development.**—*M.R.*

INSTRUMENTS

See also: **Electronic computer applications** (Inst. for Adv. Study), 9.6–13; **Topographic surveying manuals** (Dobrokhotov), 9.6–20; **Greenland Ice Cap and electronic trail markers,** 9.6–26; **Health resorts** (Undt), 9.6–87; **Pollen counting techniques** (Dingle), 9.6–89; **Solar radiation measurement and albedo of earth** (L'vova), 9.6–170; **Dew measurements,** 9.6–205; **Raindrop size distribution and raindrop recorders, Hawaii** (Blanchard), 9.6–223.

9.6–109 551.508.57:551.501.75

Väisälä, Vilho and Wilska, Yrjö, **A graphical method for computing wind values from the Finnish radiotheodolite record.** *Geophysica,* Helsinki, 6(1):7–12, **1957.** 3 figs., ref., 4 eqs. **DLC.** Also reprinted as *Helsinki. Universitet. Meteorologiska Institutet, Mitteilungen,* No. 78, **1956.** 6 p. 3 figs., ref., eqs.—The principle of the Finnish radiotheodolite and of the graphical computation of wind speeds from the data obtained by the RT-radiotheodolite is outlined in theory (geometry) and by schematic illustrations. The plotting board is also illustrated. Two antennas with a known base line receive azimuth data from the radiosonde whose height is calculated in the ordinary manner. *Subject Headings:* **1. Upper air wind computation 2. Radiotheodolite computations 3. Finnish RT-radiotheodolite.**—*M.R.*

9.6–110 551.508.53

Sanuki, M. (*Japan Met. Agency*); Kimura, S. and Toyama, S. (*both, Met. Res. Inst.*), **The time constant of a streamer.** *Papers in Meteorology and Geophysics,* Tokyo, 7(4):390–392, Jan. **1957.** 2 figs. **DWB**—With a view to investigating the characteristics of a streamer as a wind-direction indicator, a model of cylindrical streamer is tested in the wind tunnel concerning the time constant of its performed damped oscillation in the tunnel current. For comparison, a stiff cylindrical wind vane of precisely the same dimensions is also tested. The measurement is carried out in four steps of wind speed up to 20 m/s. It is found that the time constant of the streamer is utterly constant, independent of wind speed, which fact stands in contrast to the case of most wind vanes where the time constant is inversely proportional to the wind speed. *Subject Headings:* **1. Wind indicators 2. Wind streamers 3. Time constant of streamers 4. Wind tunnel experiments.**—*Authors' abstract.*

9.6–111 551.508.53/4

Sanuki, M. (*Central Met. Obs.*); Kimura, S. and Toyama, S. (*both, Met. Res. Inst.*), **Anemometer reading in the presence of nearby obstacle.** *Papers in Meteorology and Geophysics,* Tokyo, 6(2):140–143, Sept. **1955.** 4 figs., ref. eqs. **DWB**—A three-cup anemometer and a combination wind vane and anemometer model are tested in wind tunnel as to their rotational speed in the presence of a cylindrical obstacle. Somewhat consistent and remarkable errors in reading, especially in the lee-side, are observed which should be taken into account in wind speed measurement at towers, pylons, etc. *Subject Headings:* **1. Anemometer errors 2. Wind effects on anemometer readings.**—*Authors' abstract.*

9.6–112 551.508.54

Huovila, Seppo (*Inst. of Met., Univ. Helsinki*), **Hot body anemometers.** *Geophysica,* Helsinki, 6(1):45–51, **1957.** 3 figs., 12 refs., 3 eqs. **DLC**—Several types of "hot body" anemometers are discussed and illustrated, namely the katathermometer (L. Hill, 1915), the hot-wire anemometer (L. V. King, 1915), the thermocouple anemometer, and the thermistor anemometer. Finally, the calibration methods and unusual effects at low wind speeds or when the wind is blowing at a sharp angle or parallel to the hot wire are described. Other sources of error arise from sudden changes in relative humidity, dust, etc. Accuracy of 5–10% can be attained; however, sensitivity decreases with decreasing wind speed. *Subject Headings:* **1. Hot body anemometers 2. Katathermometers 3. Hot wire anemometers.**—*M.R.*

9.6–113 551.508.71

White, W. C. (*General Electric Co., Schenectady, N. Y.*), **A new electrical hygrometer.** *Electrical Engineering,* N. Y., 73(12):1084–1087, Dec. **1954.** 6 figs., ref. **DLC**—Characteristics and performance of an electrical resistance hygrometer designed for use on a 120V

a-c line and operating between 20 and 100% relative humidity are described and illustrated graphically and photographically. The alumina core absorbs moisture, which increases the conductivity. Sometimes it absorbs too fast and indicates >100% relative humidity. A heater coil is provided to prevent such action, but on occasion the heating cannot keep up with the condensation or absorption, and also it takes time to come to a balance after being unused. A resistance (not too high) must be used to prevent damage to core in case moisture absorption is great. Two 10-W, 230V lamps in series preserve linearity. *Subject Heading:* **1. Electrical hygrometers.**—*M.R.*

9.6–114 551.508.72

*Federov, S. F., **Opyt ekspluatatsii gidravlicheskogo pochvennogo isparitelia maloĭ modeli (GPI-51).** [Experiment on the use of the small model hydraulic soil evaporimeter, GPI-51 type.] *Leningrad. Gosudarstvennyĭ Gidrologicheskiĭ Institut, Trudy*, 45(99):121–141, **1954.** 5 figs., 9+5 tables, 3 refs. **DLC** (GB651.L38)—Results of observations of evaporation carried out at VNIGL (Valday Hydrological Observatory) in the period 1951–1953, as well as the design of the implement, are presented and discussed. Besides that, the author draws some conclusions on the efficiency of the evaporimeter on the basis of his own observations and of data obtained at Kamennaia Step' and Dubovka Hydrometeorological Observatories in 1952, and presents an evaluation of the work of the evaporimeter. It has been found that, in view of the accuracy of its measurements, it would be expedient to introduce it in the network of specialized stations and research institutions studying evaporation from the soil. *Subject Headings:* **1. Soil evaporimeters 2. Evaporation from soil.**—*A.M.P.*

9.6–115 551.508.72:551.48

*Fedorova, T. G. and Konstantinov, A. R., **Opyt ekspluatatsii plovucheĭ isparitel'noĭ ustanovki.** [Experiment on the use of floating evaporimeter installations.] *Leningrad. Gosudarstvennyĭ Gidrologicheskiĭ Institut, Trudy*, 45(99):182–195, **1954.** 4 figs., 11 tables, 9 refs. **DLC** (GB651.L38)—The paper contains a description of the raft, and of the best distribution on it of equipment and instruments. On the basis of an analysis of the performance of evaporimeters, the authors demonstrate the full conformity of evaporation values measured by means of the evaporimeters installed on the raft, with evaporation values of Valdayskoe Lake. As a result of comparison of the measured evaporation values from the water surface with values computed by various methods, the authors present their suggestions concerning the suitability and the shortcomings of these methods. *Subject Headings:* **1. Evaporimeters 2. Evaporation from water surfaces.**—*A.M.P.*

9.6–116 551.508.761

Purdy, D. R. and Franklin, Roger, **Modifications to the Houghton cloud camera.** Massachusetts Institute of Technology. Dept. of Meteorology, Contract AF 19(122)-245, Scientific Report No. 5, Sept. 1, **1954.** 29 p. 7 figs. (incl. photos), 10 refs., eqs.—A number of glass-slide coatings for collecting water droplets have been tested with respect to their surface penetration, viscosity and water-vapor diffusion. Various techniques for applying the coatings before and after exposure, and with and without cover glasses, are also discussed. A cloud camera has been modified to greatly reduce the size and collection loss of the glass slide and to reduce the time lag between exposure to cloud and photographic recording. *Subject Headings:* **1. Houghton cloud camera 2. Cloud cameras.**—*Author's abstract.*

9.6–117 551.508.765

Massachusetts Institute of Technology. Dept. of Meteorology, **An electric probe drop counter.** Contract AF 19(604)-1287, Scientific Report No. 1, Sept. 15, **1955.** 3 p. 11 figs., 6 refs.—The electric cloud drop sizing and counting probe previously described has been modified for airborne use. The sensing element is enclosed in an ellipsoid supported by a streamline strut. *Subject Headings:* **1. Cloud drop counters 2. Cloud drop size.**—*Author's abstract.*

9.6–118 551.508.77

*Hoehne, Walter E., **Field evaluation of model XA rainfall rate and total catch indicator (a supplement to NRL Memorandum Report 613).** *U. S. Naval Research Laboratory, NRL*

Memorandum Report, 638, Oct. 1956. 4 p. 7 figs., ref. **DWB** (M08.77 H693t)—This report is a field evaluation of Model XA Rainfall Rate and Total Catch Indicator and is supplementary to the technical evaluation contained in *NRL Memorandum Report* 613. The instrument operated from the time of its field installation until it was returned to the manufacturer. The failures and inaccuracies that occurred were, for the most part, predicted in the previous report. The pre-heater continued to be the most erratic portion of the system. A pen was installed to give a continuous record of the pre-heater operation. A discussion of portions of this record plus some suggestions for adaption and improvement are included in this report. *Subject Heading:* **1. Rainfall recorders.**—*Author's abstract.*

9.6–119 551.508.77:551.578.11

Magarvey, R. H. (*Acadia Univ., Canada*), **A two-camera technique for measuring fall velocities.** *Journal of Scientific Instruments*, London, 34(12):508–509, Dec. **1957.** fig. 5 refs. **DLC**—A photographic technique is described that affords data on several phenomena associated with freely falling drops. An essential feature of the technique is a two-camera shutter designed to obtain photographs of the falling drops at two fall distances. Velocities are calculated from a consideration of displacement and time data that appear on the photographs. Information regarding the dynamics of drop deformation is inferred from the geometry of the image pairs and the time interval between photographs. The time interval is dependent on the dimensions and speed of the shutter. The possible error in the calculated velocities of large drops is 2.5%. *Subject Headings:* **1. Raindrop velocity measurement 2. Raindrop photography.**—*Author's abstract.*

SYNOPTIC ANALYSIS AND FORECASTING

See also: **Forecasting water conditions, Calif.,** 9.6–11; **Practice forecast manuals** (U. S. W. B.), 9.6–17; **Radar rain forecasting, Japan** (Otsuka); 9.6–92; **Weather types and probabilities, Hungary** (Peczely), 9.6–264.

9.6–120 551.509

Bilancini, R., **Le delusioni del meteorologo.** [Frustrations of a meteorologist.] *Rivista di Meteorologia Aeronautica*, Rome, 17(3):55, July/Sept. **1957.** **DLC**—The author describes the frustration experienced by all young meteorologists when, after acquiring a good theoretical background and achieving some initial success in forecasting, they find themselves confronted with situations apparently out of tune with theory. It is important not to lose confidence during this period of depression, the author advises. The editorial is concluded with verses expressing the feelings of a disheartened meteorologist (translated from the English original of D. S. Hancock, *Weather*, March **1957**). *Subject Headings:* **1. Weather forecasting 2. Meteorologists.**—*G.T.*

9.6–121 551.509.2:621.397.9

Neyland, Lewis J. and Callahan, Cornelius J. (*both, Hdq., Air Weather Service, U. S. Air Force*), **Weathervision.** *Weatherwise*, Boston, 10(2):42–43, April **1957.** 2 figs. **DWB**—The experimental use of industrial TV for transmitting weather maps to U. S. Air Force Weather bases is described, the equipment illustrated and a block diagram showing schematically Grandview Air Force Base, Missouri, Weathervision, layout, installed in 1956, is presented. A transmitting console and 5 receivers are standard equipment for each base. *Subject Headnings:* **1. Television weather transmission 2. Weathervision.**—*M.R.*

9.6–122 551.509.21:621.390

Hegyi, István, **A moszkvai Központi Időjelző Intézet szinoptikus rádiókonzultációi.** [Synoptic briefings by radio from the Moscow Central Forecasting Institute.] *Időjárás*, Budapest 55(1/2):1–2, Jan./Feb. **1951.** **DLC**—The daily broadcasts over shortwave transmitters of the Tsentral'nii Institut Prognozov are described. The half-hour broadcasts include detailed discussion of 1) synoptic surface and upper-air development during the past 24 hrs, 2) position

characteristics and movements of fronts and 3) expected synoptic development for the next 24 hrs. *Subject Headings:* **1. Synoptic reports 2. Weather broadcasting 3. Data processing 4. U.S.S.R.**—*G.T.*

9.6–123 551.509.314:519.24:551.524.36

Roop, F. C., **Study of fundamentals in weather forecasting.** *American Petroleum Institute, 36th Annual Meeting, Chicago, Nov. 1956, Proceedings*, Section 6/7, **1956.** p. 94–95. **DLC**—Reports reviewing the history and present status of long-range degree-day forecasting have been prepared by a meteorological consultant for the API Advisory Committee on Fundamental Research on Weather Forecasting. Research in this field has not yet produced generally acceptable methods. Electronic computing methods are now applicable to the statistical approach, making this the most likely to yield reliable and efficient results in the foreseeable future. The Advisory Committee is actively seeking to initiate a statistical research project which will also incorporate the use of synoptic information. *Subject Headings:* **1. Degree-day forecasting 2. Statistical forecasting.**—*From author's abstract.*

9.6–124 551.509.3:551.577.37:551.579.4

*Ward, Nicolas (*Lebanon, Service Météorologique*), **Les pluies torrentielles du Nord-Liban du 17 décembre 1955.** [Torrential rains of North Lebanon, Dec. 17, 1955.] *La Météorologie*, Paris, Ser. 4, No. 43:285–288, July/Sept. **1956.** 3 figs. **DWB**—The torrential rains which occurred in Syria and Lebanon on Dec. 17, 1955 were connected with a cold front and cold pool which affected Tripoli earlier the same day. The details of the rainfall, flash flood runoff (150 deaths, millions of francs damage, an ass found in a tree-top, etc. in Tripoli), the isohyets in Tripoli, surface and 500 mb charts for the Mediterranean, and other data are discussed and illustrated. The history of the cold pool from Dec. 15–19 is reviewed. *Subject Headings:* **1. Synoptic case history studies 2. Flood producing storms 3. Cold vortexes 4. Excessive rainfalls 5. Mediterranean Basin 6. Tripoli 7. Lebanon.**—*M.R.*

9.6–125 551.509.31

Dokken, Brynjolf, **On the kinematics of the atmospheric friction layer.** *Meteorologiske Annaler*, Oslo, 4(2):13–16, **1955.** 5 eqs. **DLC**—A theoretical derivation of the rule that "There is ascendance by acute-angled troughs and obtuse-angled ridges. There is subsidence by obtuse-angled troughs and acute-angled ridges." *Subject Heading:* **1. Synoptic analysis.** —*I.L.D.*

9.6–126 551.509.312:551.515.11

*Gibbs, W. J. (*Central Met. Bureau, Melbourne*), **200 mb divergence associated with rapid and intense cyclogenesis.** *Australian Meteorological Magazine*, Melbourne, No. 11:17–35, Dec. **1955.** 15 figs., 3 refs., 10 eqs. **DWB**—The vorticity and divergence at the 200 mb level are evaluated by two methods for the Australian area by using specially constructed nomograms, although the process is tedious. Streamline-isotach charts give smoother divergence patterns than the SAWYER-MATTHEWMAN grids and c-p topography. Errors of 2×10^{-5} sec^{-1} are involved. Examples of computations for May 16–18, 1955, a situation with rapid cyclogenesis east of the S.W. Coast of Australia, are presented and discussed for both methods. The theory behind the nomograms and their use is presented in some detail as well as the nomograms themselves. *Subject Headings:* **1. Divergence computations 2. 200-mb analysis 3. Cyclogenesis 4. Australia.**—*M.R.*

9.6–127 551.509.312:551.547.1

Lutfulin, I. Z., **Postroenie karty AT_{700} za promezhutochnye sroki.** [Construction of an AT_{700} chart for intermediate periods.] *Meteorologiia i Gidrologiia*, Leningrad, No. 2:21–24, Feb. **1956.** 3 figs., 7 refs. **DWB, DLC**—In order to eliminate the existing defects in baric topography charts used in practical forecasting, the author proposes a method for constructing such charts on the basis of surface data and previous aerological charts. A formula is developed

for calculating the variation of H_{700} in order to determine atmospheric flow at 3 km for any season and any time, namely:

$$\partial H_{700} = \partial H_{1000} + 2/3 (\partial H^{700}_{1000})\text{adv.}$$

Graphs show the relationship between local advective changes ∂H^{700}_{1000} during winter and summer both by day and night. *Subject Heading:* **1. Baric topography charts.**—*I.L.D.*

9.6–128 551.509.311

Mauersberger, Peter (*Inst. f. Met. und Geophysik, Humboldt-Univ. Berlin*), **Approximation einer durch Beobachtungen in diskreten Abszissenpunkten vorgegebenen Funktion mittels eines Systems orthogonaler Polynome im Sinne der Methode der kleinsten Quadrate ohne Verwendung einer Ausgleichsrechnung.** [Approximation of a spherical function determined by observations at discrete points on an abscissa by means of a system of orthogonal polynomials using the method of least squares without application of a smoothing technique.] *Beiträge zur Geophysik*, Leipzig, 65(4):309–330, **1956.** 13 refs., 37 eqs. German and English summaries p. 309. **DWB, DLC.** *Subject Heading:* **1. Numerical forecasting.**

9.6–129 551.509.312:551.515.22

§U. S. Office of Naval Operations, **Objective prediction of 24 hour tropical cyclone movement.** Its *NAVAER* 50-1P-542, May **1956.** 28 p. 10 figs., 4 refs., tables. **DWB** (M053 U585n)—Full-fledged typhoons or hurricanes moving within the area from 8° to 35°N during 1952–55 are analyzed to provide objective tools for forecasting the areas of generation, 24 hr position, intensity and extent of area dangerous to surface or aircraft. The zonal, meridional and latitudinal effect components are treated and synoptic examples showing calculation procedures worked out and presented. Nomograms and scatter charts as well as storm track charts are included. Prediction errors (for 1955) indicate that 24-hr path and distance of movement can be predicted with reasonable accuracy. Good 500 mb charts are essential hence reconnaissance reports must be available where radiosonde reports do not exist. *Subject Headings:* **1. Objective tropical cyclone forecasting 2. Hurricane forecasting.**—*M.R.*

9.6–130 551.509.311

*Wadswoth, G. P., **Mathematical analysis of some atmospheric dynamics and statistical prediction of surface pressure by linear and quadratic functions of pressure sequences at grid points.** Massachusetts Institute of Technology. Div. of Industrial Cooperation, Contract AF 19(604)-991, Scientific Report, No. 1, Sept. 1, **1955.** each section renumbered 17 tables, 2 refs., 60 eqs.—In the first part, CROUT presents a theoretical study of atmospheric waves, applying generalized coordinates, LAGRANGE's equations and virtual displacements. The pressure and velocity fields can be computed by a number of analyzed methods which can be successively simplified up to the point where no high speed computing facilities are necessary. The second part specifies the pressure distribution in terms of orthogonal polynomials. A quadratic instead of a linear function of the pressure improves the results only by 5–10%. Appendix A shows the construction of polynomials; Appendix B the data used in the analysis. *Subject Headings:* **1. Numerical forecasting 2. Statistical forecasting 3. Dynamics of the atmosphere. I. Crout, Prescott D.**—*A.A.*

9.6–131 551.509.31

Lorenz, Edward N., **Empirical orthogonal functions and statistical weather prediction.** Massachusetts Institute of Technology. Dept. of Meteorology, Contract AF 19(604)-1566 "Statistical Forecasting Project," Scientific Report, No. 1, Dec. **1956.** 49 p. 2 figs., tables 13 refs., 75 eqs.—The sea level pressure distribution over the U. S. and southern Canada based on observations at 64 stations, can be represented by 8 orthogonal functions of space (Y's) and 8 orthogonal time functions (Q's) so that 91% of the variance is specified. No improvement can be gained by using a larger number of time functions. *Subject Headings:* **1. Empirical orthogonal functions 2. Statistical forecasting.**—*M.R.*

9.6–132 551.509.317:551.515.11:551.511.32

Breistein, M. and Smebye, Sigurd J., **En anvendelse av prinsippet om hvirvlingens bevarelse til beregning av rygger og trågs forflytning i 500 mb.-nivået.** [Application of the principle of conservation of vorticity to the calculation of movements of ridges and troughs at the 500 mb level.] *Norske Videnskaps-Akademi i Oslo. Institutt for Vaer- og Klimaforskning, Report*, No. 3, **1952.** 7 p. 2 figs. **DWB** (M055 M863p)—A formula, similar to PETTERSSEN's, for forecasting displacement of isobaric troughs and ridges, is used:

$$C = 2L\frac{T_1 - T_2}{\zeta_3 + \zeta_4 - 2\zeta_0}$$

where T is vorticity tendency, ζ the absolute vorticity, L half of the distance between points 1 and 2. Computed displacements for Dec. 1948 are compared with actual 24-hr displacement on the average by 4° long. at 52°N. Correlated coefficient between computed and observed displacements was $r = 0.86$ for troughs and 0.79 for ridges. Regression lines are shown on scatter diagrams. *Subject Headings:* **1. Forecasting displacements of troughs and ridges 2. Vorticity conservation.**—*From Authors' abstract and M.R.*

WEATHER CONTROL

See also: **Cloud physics conference** (Houghton), 9.6–47.

9.6–133 551.509.617

Guilmet, B., **La pluie provoquée; le problème de sa rentabilité.** [Rain making; is it economical?] *Cahier des Ingénieurs Agronomes*, Paris, No. 120:13–16, Nov. **1957. DA**—The theory of rain formation, rain-producing agents, seeding techniques, evaluation of the results, and amount of the affected crops are reviewed. The author concludes that rainmaking cannot influence in any way the general development of a weather situation. Its effects are purely local and of very brief duration. *Subject Heading:* **1. Cloud seeding evaluation.**—*A.V.*

9.6–134 551.509.67

Braham, Roscoe R., Jr. and Sievers, John R. (*Cloud Phys. Proj., Dept. of Met., Univ. of Chicago*), **Overseeding of cumulus clouds.** (In: Conference on the Physics of Cloud and Precipitation Particles, Sept. 1955, **Proceedings,** Pub. N. Y. Pergamon Press, **1957.** p. 250–266. 2 figs., 10 tables, 13 refs., eqs.) **DLC** (QC921.5.U5), **DWB**—Data obtained from numerous aircraft flights through cumulus clouds in central U. S. are presented, together with theoretical considerations of dry-ice seeding. It is shown that an expected concentration of sublimation nuclei of $10^8/m^3$ could convert an average cumulus cloud into ice crystals only within 100 sec and the resulting ice crystals would not grow to a size sufficiently large enough to be detected by the methods of measurement indicated. Flight observations indicate that this "drying-up" of a cumulus cloud is not generally observed in clouds treated with dry ice, and that the formation of clear ice on aircraft surfaces in the majority of treated clouds suggests that the resulting concentration of ice crystals from dry-ice seeding is much less than a theoretical yield would indicate. *Subject Headings:* **1. Overseeding 2. Cloud seeding with dry ice.** —*Authors' abstract.*

9.6–135 551.509.67

U. S. Advisory Committee on Weather Control, **First interim report.** Wash., D. C., Feb. **1956.** 11 p. **DWB** (M09.6 U582i)—A summary of the authorization, the tasks and tentative conclusions with respect to the present and future possibilities of rain making. Economically important results of cloud seeding are claimed for the West Coast area (9–17% increase) and that AgI particles do not become deactivated in bright sunshine for at least 45 min. (a testing project was established on and near Mt. Washington, N. H.). Basic research is to be encouraged and a 2-yr program of statistical evaluation undertaken. Hail and lightning suppression should be studied. *Subject Headings:* **1. U. S. Advisory Committee on Weather Control 2. Cloud seeding evaluation.**—*M.R.*

STRUCTURE AND PHYSICS OF THE ATMOSPHERE

COMPOSITION OF THE ATMOSPHERE

See also: **Air properties and temp. effects** (Gilmore), 9.6–12; **IGY satellite program** (Whipple), 9.6–39.

9.6–136 551.510.4

*Whitby, K. T.: Algren, A. B. and Jordan, R. B. (*all, Univ. of Minnesota, Minn.*), **Size distribution and concentration of air-borne dust.** *American Society of Heating and Air-Conditioning Engineers, Transactions*, 61:463–482, pub. **1956.** 8 figs., 7 tables, 9 refs. **DWB** (P A512sw)—Describes, illustrates and gives data resulting from size analysis of airborne dust by microscope, by sedimentation, and by photometric measurements on dust spots (in filters). Advantages and limitations of the several methods are discussed. Data are presented in tables and curves and methods illustrated and discussed. *Subject Headings:* **1. Dust size distribution measurement 2. Aerosol analysis 3. Particle size determination.**—*M.R.*

9.6–137 551.510.41:551.574.1

Vittori Antisari, Ottavio (*Observatorio di Monte Cimone, Sestola* (*Modena*) *Italy*), **Research in chemical composition of some forms of atmospheric particles.** Chicago Univ. Dept. of Meteorology. Cloud Physics Lab., Research Grant RG-4521 (National Institutes of Health). Technical Note, No. 5, Dec. 15, **1956.** 48 p. 12 figs., 5 tables, 16 refs., bibliog. of reports by the Cloud Physics Lab., p. (51–54)—Procedures have been developed for identifying the chemical composition and size of airborne particles. The basic technique involves the capture of the particles in a specially treated gel. Reagents in the gel produce a physico-chemical reaction known as the Liesegang reaction. The products of the reaction precipitate in the form of rings. Identification of the particles is made by one or more of three factors: the character of the pattern of the precipitate, the color of the precipitate, or its change of color. Tests were developed for particles containing the following substances: chlorides, soluble iodides, soluble sulfide, soluble ferrocyanide, soluble sulfates, nitrates, potassium ion, soluble silver, fluorides, lead and all heavy metals. Details are given for the preparation of the gels to be used for specific tests, and techniques for the capture of particles are discussed. A discussion is given of experiments conducted to study the production of sulfate particles by the burning of wood or coal. A technique for the capture of small water droplets and analysis of the salts which may be dissolved in them is described. *Subject Heading:* **1. Chemical composition of atmospheric particles.**—*Author's abstract.*

ATMOSPHERIC POLLUTION

See also: **Public health** (Borisova), 9.6–88; **Nuclei in polluted air** (Junge), 9.6–201.

9.6–138 551.510.42

Hendrickson, E. R.; Keagy, D. M. and Stockman, R. L., **Evaluation of air pollution in the State of Washington: a joint report with the State of Washington Dept. of Health, July 1–Nov. 30, 1956.** Cincinnati, Ohio, Robert A. Taft Sanitary Engineering Center, **1957.** 145 p. tables, 50 refs.—A detailed report of a survey of population and industrial distribution and trends, climate, topography, sources of pollution (transportation, domestic, industrial, and refuse disposal), and of attempts made to control pollution. The general aspects are considered first, and then the details on a city by city basis, starting with the 17 biggest industrial centers (Seattle, Tacoma, Spokane, Everett, etc.) and then 16 selected smaller communities. Previous studies of general and special problems are discussed and outlined. Notable progress has been made in some types of pollution control in some areas (e.g., SO_2 or soot reduction). Sources of climatic data as well as local and general climatic effects are outlined in various parts of the report. *Subject Headings:* **1. Atmospheric pollution studies 2. Climate of Washington State 3. Washington State. I. Washington (State) Dept. of Health.**—*M.R.*

9.6–139 551.510.42:551.584.6

Shagan, I. B. (*Leningrad Sanit. Hyg. Inst.*), **Prisposobleniia dlia otbora prob vozdukha v zone dykhaniia rabotaiushchikh na proizvodstve.** [A method of sampling air in the breathing

zone by industrial workers.] *Gigiena i Sanitariia*, Moscow, 21(7):51–52, **1956.** 2 figs. **DLC**—With the aid of diagrams, the author describes the apparatus which consists of a nozzle fastened to a camera stand. For those cases where a stand with a nozzle cannot be used, the apparatus can be attached to head of the worker, and a diagram illustrating this is presented. *Subject Headings:* **1. Air sampling and analysis 2. Industrial indoor air.**—*I.L.D.*

9.6–140 551.510.42

Weiss, E. (*Linz*), **Luftverunreinigung durch Industrieabgase in Linz.** [Atmospheric pollution by industrial waste gases in Linz.] *Wetter und Leben*, Vienna, 7(8/11):278, **1955.** **DLC**—The author describes briefly the activities of the Air Pollution Investigations Bureau of Linz. Wind direction studies, chemical analysis of the pollutants and tests for the presence of sulfur were carried out. H. Cauer's procedure for air analysis was introduced recently. *Subject Headings:* **1. Atmospheric pollution 2. Air sampling and analysis 3. Linz, Austria.** —*I.L.D.*

9.6–141 551.510.42

Weiss, E. and Frenzel, J. W., **Untersuchungen von Luftverunreinigungen durch Rauch- und Industriegase im Raume von Linz.** [Investigations in atmospheric pollution by smoke and industrial gas in the Linz area.] *Wetter und Leben*, Vienna, 8(5/6):131–147, **1956.** 7 figs., 3 tables, 4 refs. **DWB**—The extent of atmospheric pollution by industrial gases was investigated by determining the SO_2–SO_3 content of the atmosphere with the Bambergev-Nussbaum-Liesegang method. An aqueous solution of calcium carbonate and glycerine is used as the absorption fluid. The apparatus and procedure and the distribution of sampling stations are described. Data, presented in tables and graphs, include sulfur values in mg s/100 hours, 100 cm^2 for the period Dec. 15, 1953–Jan. 15, 1955, temperature, humidity, cloudiness and precipitation during the measuring period, dependence of sulfur values upon distance from source, wind distribution during sampling periods, etc. *Subject Headings:* **1. Atmospheric pollution 2. Air sampling and analysis 3. Industrial gases 4. Linz, Austria.**—*I.L.D.*

STRUCTURE OF THE ATMOSPHERE

9.6–142 551.510.52/3

Kvaratskheliia, I. F., **K voprosu ob opredelenii tropopauzy.** [The problem of determining the tropopause.] *Meteorologiia i Gidrologiia*, Leningrad, No. 6:30–32, June **1945.** 1 ref. **DWB, DLC**—The nature of the tropopause is reviewed briefly, including its temperature characteristics and its relation to troposphere and stratosphere and the problem of its determination, namely, the fact that at the same place and time several tropopause layers are observed. The temperature distributions of these multiple layers are discussed. *Subject Heading:* **1. Tropopause.**—*I.L.D.*

9.6–143 551.510.534

Dutsch, H. U., **A revised large-scale mixing scheme and its application to the ozone problem.** *I.U.G.G. Association of Meteorology, Rome, 1954, Scientific Proceedings.* London, Butterworth, **1956.** p. 217–220. 2 figs., 3 eqs. **DWB**—The very strong increase of the total amount of ozone occurring at higher latitudes from the middle of Jan. to the end of Feb. can be explained only as the assumption of a meridional (south to north) transport of ozone. A strong flow of ozone must be directed northward at middle latitudes. It is shown that this apparent contradiction to the well-established observation "that flow from the north and south are connected with an increase and decrease respectively of the total amount" is not real. It is shown mathematically that the meridional transport of ozone can be caused by large scale horizontal mixing for tropospheric and stratospheric conditions, and computations are carried out for explaining the sudden increase in the total amount of ozone observed in higher latitudes during the second half of winter in terms of large scale mixing. *Subject Headings:* **1. Ozone distribution 2. Meridional transport of ozone.**—*I.L.D.*

9.6–144 551.510.534

Normand, Charles W. B., **On the European ozone observations 1950–1954.** *I.U.G.G. Association of Meteorology, Rome, Sept.* 1954, *Scientific Proceedings.* London, Butterworth,

1956. p. 165–171. 7 figs. **DWB**—In this summary of the European ozone observation during 1950–54, etc., author discusses the comparative daily ozone values at six stations daily ozone values at Oxford, Jan.–June 1951–54, and July–Dec. 1950–53, interdiurnal var ability of ozone, annual variation of ozone at 12 stations, annual variation of ozone in th Northern Hemisphere. Observational data are presented in graphic form. *Subject Heading* **1. Ozone data 2. Annual ozone variations 3. Europe.**—*I.L.D.*

9.6–145 551.510.53

Pokrovskiĭ, V. N., **K metodike vychisleniia vertikal'nogo raspredeleniia ozona v atmosfere** [Method of figuring the vertical distribution of ozone in the atmosphere.] *Moscow. Tsentral naia Aerologicheskaia Observatoriia, Trudy*, No. 16:21–25, **1956.** 4 refs., 4 eqs., fig. **DLC**— An attempt to develop the theory for computing the vertical distribution of ozone in th atmosphere when data on the spectral intensity of solar radiation beyond the atmospher limits are not available (the spectral instrument did not reach the upper limits of the ozon layer) is presented. *Subject Heading:* **1. Vertical ozone distribution.**—*A.M.P.*

UPPER ATMOSPHERE—IONOSPHERE

See also: **High alt. flying conditions, Asia** (Timofeev), 9.6–77; **Eclipse effects on radio waves, Nigeria** (Piggott), 9.6–265; **Eclipse effects on ionospheric layers, Sweden** (Stoffregen), 9.6–267; **Eclipse effects on E layer** (Szendrei, McElhinny), 9.6–268; **Eclipse effects on F2 layer** (Thomas, Robbins), 9.6–269; **Counterglow and night sky luminescence, U.S.S.R.** (Rozhkovskii), 9.6-272.

9.6–146 551.510.535:551.510.6

Aitchison, G. J., (*Dept. of Physics, Univ. of Adelaide*), **Ionospheric demodulation of radi waves at vertical incidence.** *Australian Journal of Physics*, Melbourne, 10(1):204–20 March **1957.** 2 figs., 3 refs., 2 eqs. **DLC**—In a previous communication, Aitchison an Goodwin (1955) have described an investigation carried out at the University of Adelaid on the demodulation of radio waves at vertical incidence. At a frequency of 1550 kc/s, whic is close to the local gyro frequency of approximately 1600 kc/s at the height of the *E* laye of the ionosphere, marked reductions in the modulation depth were observed on the sky wave The experimental results tabulated in the previous communication suggested that the effec was greatest at a modulation frequency of the order of 800–1500 kc/s. From subsequen measurements it is apparent that, in the case of *F*-layer reflection, the demodulation wa greatest at a modulation frequency of, very approximately, 1 kc/s; in the case of *E*-laye reflection, the degree of demodulation did not vary markedly with change of modulation fre quency. *Subject Heading:* **1. Ionospheric radio wave demodulation.**—*Author's abstract.*

9.6–147 551.510.535:551.594.1

Becker, Walter, **Über ein Verfahren zur routinemässigen Bestimmung der wahre Verteilung der Elektronendichte in einer Ionosphärenschicht aus den Durchdrehaufnahme dieser Schicht.** [A method for routine determination of the true distribution of electro density in an ionospheric layer from sweep frequency records for this layer.] *Archiv de Elektrischen Übertragung*, Stuttgart, 10(5):207–214, May **1956.** 9 figs., 2 tables, 4 ref German and English summaries p. 207. Also his: **Méthode graphique pour la détermination courante des distributions verticales de la densité électronique dans les couches ionosphérique d'après les enregistrements obtenus par balayage de fréquence.** [Graphical method fo routine determination of vertical electron density distribution in ionospheric layers from swee frequency records.] *Annales des Télécommunications*, Paris, 12(5):141–145, May **195** 6 figs., table, 3 refs. **DLC**—The Booker-Seaton (1940) method of determining electron densit from height and sweep frequency records is discussed critically and illustrated, and a generalize method is extended to enable one to calculate the electron density and the form of the ion spheric layer (whether Epstein, cosine or parabolic shape) and the influence of the geomagnet field. It also enables one to determine the half thickness of the layer. *Subject Heading*

1. Ionospheric sounding techniques 2. Booker-Seaton electron density techniques 3. Ionospheric electron density calculation.—*M.R.*

9.6–148 621.396.11:551.510.535

Budden, K. G. and Clemmow, P. C., **Coupled forms of the differential equations governing radio propagation in the ionosphere, Pt. 2.** *Cambridge Philosophical Society, Proceedings,* 53(3):669–682, July **1957.** 10 refs., 97 eqs. Includes errata for Pt. 1 (*see* 6D–236, April 1955, *MAB*). **DLC**—The four first-order "coupled" equations governing the propagation of electromagnetic waves in the ionosphere, previously obtained in symbolic matrix form (Clemmow and Heading (4)), are expressed explicitly in terms of the ionospheric parameters. The physical significance of the equations is illustrated by considering the energy flux in one characteristic wave when coupling and damping are neglected. Three special cases are then discussed for which second-order coupled equations are also given, namely, the cases of (a) vertical incidence with oblique magnetic field, (b) oblique incidence with vertical magnetic field, (c) horizontal magnetic field in the plane of incidence. For case (a) the second-order equations are those previously derived by Forsterling (5). The form of the coupled equations is physically illuminating and, in principle, suitable for solution by successive approximations. Extensive numerical work has indeed been carried out on the second-order coupled equations in case (a) (e.g., Gibbons and Nertney (6)), and it is probable that the first-order coupled equations would prove more advantageous. The present authors, however, feel that better methods are available for purely numerical work (e.g., Budden (3)), and that the chief interest of the coupled form is that it shows the scope and limitations of the physical conception of characteristic waves. *Subject Headings:* **1. Electromagnetic wave propagation 2. Ionospheric reflection.**—*Authors' abstract.*

9.6–149 551.510.535:551.510.62

Flórián, Endre, **Rádióhullámok az ionoszférában.** [Radio waves in the ionosphere.] *Természet és Társadalom,* Budapest, 115(6):355–359, June **1956.** photos, diagrs. **DLC**—The role of various atmospheric layers in the propagation of radio waves of different lengths is discussed; the geometry of ionospheric reflection is explained with the help of schematic diagrams. Since 1955 regular hourly measurements of ionospheric parameters have been made at Budapest (height and density of ionospheric layers, etc.). Ionospheric research activities in Hungary are being conducted with two objectives in mind, namely (a) to determine (and soon to forecast) radio propagation conditions and (b) to find relations between ionospheric anomalies, temperature variations, etc. and weather development in the lower atmospheric layers. *Subject Headings:* **1. Ionospheric radio wave propagation 2. Ionospheric reflection 3. Hungary.**—*G.T.*

9.6–150 551.510.535/6

Kallmann, H. K.; White, W. B. and Newell, H. E., Jr., **Physical properties of the atmosphere from 90 to 300 kilometers: proposed "Speculative Atmosphere" submitted to the Working Group on Extension to the U. S. Standard Atmosphere Tables.** *Journal of Geophysical Research,* Wash., D. C., 61(3):513–524, Sept. **1956.** 3 figs., 2 tables, 19 refs., 22 eqs. **Erratum in [their]: Physical properties of the atmosphere from 90 to 300 kilometers.** *Ibid.,* 62(1):168, March **1957.** fig. **DLC**—Based on recent experimental and theoretical studies of the physical properties of the atmosphere at high altitudes, an average model atmosphere is presented for the region between 90 and 300 km. This model is consistent with the following assumptions: Molecular oxygen begins to dissociate appreciably only above 90 km; at around 130 km, about 30% of O_2 is still in the undissociated state; molecular nitrogen begins to dissociate above 220 km; the concentrations of molecular oxygen and nitrogen decrease with altitude exponentially; the temperature becomes isothermal in the region of the exosphere, approximately above 360 km. All physical quantities have been calculated from self-consistent equations as continuous functions of altitude, without assuming any particular form of the temperature gradient. The results show lower temperatures and densities throughout the region of the ionosphere than have been deduced previously. *Subject Headings:* **1. Standard atmosphere 2. Upper atmosphere models 3. Exosphere.**—*Authors' abstract.*

MECHANICS AND THERMODYNAMICS OF THE ATMOSPHERE

See also: **Forecasting displacements of troughs and ridges** (Breistein, Smebye), 9.6–132; **Stratiform cloud formation and turbulent mixing** (Matveev, Kozharin), 9.6–209; **Climate and heat balance** (Shvets), 9.6–241.

9.6–151 551.511:531/2

Kao, Shih-Kung, **Stability of the motion of a rotating axial symmetrical solid body in a fluid.** *American Geophysical Union, Transactions*, 38(6):831–834, Dec. **1957.** 3 refs., 32 eqs. **DWB, DLC**—The stability criterion of the motion of an axial symmetrical solid body rotating about its axis of revolution and moving in the direction perpendicular to its axis of rotation is obtained. The major controlling factors which stabilize a rotating top in a fluid are examined. For a flat circular top (A < B) the stabilizing effect of rotation appears less effective in the case of the rotating top translating in the direction perpendicular to the axis of rotation than parallel to the axis of rotation; the translation velocity destabilizes the rotating top in the former case but stabilizes it in the latter case. *Subject Heading:* **1. Rotation of solids in fluids**—*Author's abstract.*

9.6–152 551.511:551.55

Rauner, Iu. L., **O raschete teplo- i vlagoobmena v usloviiakh termicheskoĭ konvektsii.** [Calculation of the thermal and moisture balance under thermal convection conditions.] *Akademiia Nauk SSSR, Izvestiia, Ser. Geofizich.*, No. 11:1354–1357, **1956.** 2 figs., table, 8 refs., 4 eqs. **DLC**—The role of the thermal factor in turbulent heat and moisture exchange, especially under superadiabatic conditions, is discussed with particular reference to the turbulence exchange equations of A. S. Monin and A. Obukhov. A correction factor is developed for calculating more precisely the heat and temperature exchange and its use is illustrated. The formulas and the correction factor for calculating heat and moisture exchange at the layer near the ground during thermal convection are:

$$P = 0.58V(DT)\int(\beta)\varphi(V_1)$$

$$LE\ 0.90V(De)\int(\beta)\varphi(V_1),$$

where P and LE are turbulent heat exchange and moisture, respectively, (cal/cm min)² V = "velocity of "; DT and De—vertical difference of temperature and absolute humidity (mb); $f(\beta)$—correction for thermal stratification ($\sim$10–1); $\varphi(V_1) = 1/1 - \varphi(V_1)$—a supplementary function taking into account thermal conditions. *Subject Headings:* **1. Turbulent exchange theory 2. Moisture exchange 3. Thermal convection.**—*I.L.D.*

9.6–153 551.511.

Arakawa, Hidetoshi (*Met. Res. Inst., Tokyo*), **Rossby-Haurwitz's equation for the conservation of vertical vorticity component in the baroclinic atmosphere.** *Geofisica Pura Applicata*, 18:158–159, **1950.** 2 refs., 7 eqs. **DLC**—Following Charney's equation of conservation of vorticity, it is shown that the conservation equation of potential vorticity in the barotropic atmosphere

$$\frac{d}{dt}\left(\frac{f+\zeta}{\Delta p}\right) = 0$$

holds good, even in the baroclinic atmosphere, if it is permissible to introduce the isentropic and mass-conservation approximations. The difference between the lapse rate and the dry adiabatic is proportional to pressure and is inversely proportional to total vorticity. *Subject Headings:* **1. Conservation of vertical vorticity 2. Rossby vorticity equation.**—*M.R.* (*partly author's abstract*).

9.6–154 551.511.6:551.551.

Budyko, M. I.; Zubenok, L. I. and Strokina, O. A., **Opredelenie interval'nogo koeffitsienta turbulentnoĭ diffuzii.** [Determination of the interval coefficient of turbulent diffusion.

Meteorologiia i Gidrologiia, No. 12:34–35, Dec. 1956. 12 eqs. **DWB, DLC**—The author develops the formulas for calculating the integral coefficient of turbulent diffusion in the equations for heat and moisture exchange. These formulas are:

$$D = \frac{R-B}{\rho c_p(\theta_w-\theta)\left[1+\frac{L(q_1-q_2)}{C_p(\theta_1-\theta_2)}\right]}$$

and

$$D = k_1 \frac{\theta_1-\theta_2}{\theta_w-\theta_3} \frac{1}{ln\frac{Z_1}{Z_2}}.$$

Subject Headings: **1. Turbulence coefficient calculations 2. Turbulent diffusion.**—*I.L.D.*

GENERAL CIRCULATION

9.6–155 551.513(213)

Ramanathan, K. R., **Problems of tropical meteorology and the relation between the circulations of tropical and extratropical latitudes.** *I.U.G.G. Association of Meteorology, Rome, Sept. 1954, Scientific Proceedings*, London, Butterworth, **1956.** p. 317–321. 3 figs., 4 refs. **DWB**—The author discusses the variation of the height of the tropical tropopause, the seasonal distribution of easterlies in the upper troposphere, the origin and movement of tropical storms, waves in the upper easterlies, the coupling of tropical depressions and storms and upper easterlies, the trade inversion, etc. *Subject Headings:* **1. Tropical meteorology 2. Tropical tropopause 3. Tropical cyclone circulation.**—*I.L.D.*

ATMOSPHERIC DISTURBANCES

See also: **Cyclogenesis forecasting** (Chicago Univ. Dept. of Met.), 9.6–1; **Historical climates, Thessalonike** (Kyriazopoulos), 9.6–53; **Radar rain forecasting, Japan** (Otsuka), 9.6–92; **Aircraft hurricane reconnaissance** (Fletcher), 9.6–96; **Phenological obs. and snow cover, U.S.S.R.** (Dolgoshov), 9.6–106; **Phenological obs. and frontal movement, U.S.S.R.** (Dolgoshov), 9.6–107; **Objective tropical cyclone forecasting** (U. S. Off. Naval Operations), 9.6–129; **Forecasting displacements of troughs and ridges** (Breistein, Smebye), 9.6–132; **Vortex sheet formation** (Freeman, Jung), 9.6–159; **Cyclogenesis** (Scherhag), 9.6–160; **Microorganisms and weather sensitivity** (Kiss), 9.6–259; **Atmos. elec.-air mass relationships, Italy** (Giorgi, Molina), 9.6–277; **Thunderstorm and tornado electricity** (Vonnegut, Moore), 9.6–283.

9.6–156 551.515:551.553.8

Chicago. Univ. Dept. of Meteorology, **Severe local storms research.** Contract Cwb 8613, Report (unnumbered), Aug. 1, 1955–June 30, 1956. Issued Feb. **1957.** each section repaged. Includes Administrative report, and three unnumbered Technical Reports (separately abstracted). figs., refs., eqs. **DWB** (M15.C532s)—The three reports on mesoanalysis of severe storms which are included in this volume are: Brown, H. A.: **Mesoscale systems post-cold frontal disturbances.** Fujita, Tetsuya: **Mesoanalysis of the Illinois tornado of April 9, 1953.** Newton, Chester: **Observational studies of squall line behavior and effects of environmental wind field.** And Katz, Sey: **Further studies of development and movement of convective rainstorms** (abridged by C. W. Newton). *Subject Headings:* **1. Severe local storm analysis 2. Tornado, Urbana, Ill. (April 1953) 3. Squall lines. I. Byers, H. R.**

9.6–157 551.515.1

Duquet, Robert T. and Spar, Jerome (*both, New York Univ.*), **Cyclone types at 500 MB.** *Monthly Weather Review*, Wash., D. C., 84(12):427–435, Dec. **1956.** 6+figs., 2 tables, 6 refs. **DWB, DLC**—Examples of three types of 500-mb cyclone development, distinguished by the location of the cyclogenesis relative to the zonal velocity profile at 500 mb, are shown. Differences in the mean motion of all three cyclone types are shown to be statistically significant. *Subject Headings:* **1. Cyclone development 2. Cyclone motion.**—*Authors' abstract.*

9.6–158 551.515.1

Crutcher, Harold L. (*U. S. W. B., National Weather Records Center, Asheville, N. C.*) **Cyclone distributions along the east coast of the United States as characterized by the bivariate normal distribution.** Presented at the 150th meeting of the A.M.S., N. Y., Jan. 31, 1957 [6 p.] 3 figs., table, 7 refs. **DWB**—In many scientific fields, the bivariate normal distribution has been used to characterize the distribution of observed data. These data have been in the form of paired observations or of elements which were broken down into paired orthogonal components. The distribution of 24-hour displacements of cyclones along the east coast has been given by James E. Miller in his study on Cyclogenesis in the Atlantic Coastal Region of the United States. As an extension of his study, this paper shows that the distribution may be depicted by the bivariate normal distribution. Standard statistical tests are employed to demonstrate that this may be done. *Subject Headings:* **1. Cyclone distribution 2. East Coast, U. S.**—*Author's abstract.*

9.6–159 551.515.11:551.511.6

Freeman, John C., Jr. and Jung, Glenn H., **Summary of a theory for vortex sheet formation in the upper troposphere.** Houston, Texas, Gulf Consultants, 1956? 6 p. 11 figs., 13 eqs.—Theoretical model is supported by a graphical demonstration of how vortex sheets develop and contribute to development of cyclonic vorticity in the atmosphere near fronts. *Subject Headings:* **1. Vortex sheet formation 2. Vorticity development 3. Cross sections.**—*M.R.*

9.6–160 551.515.13 551.515.23 551.515.33

Scherhag, Richard, **Zyklogenese.** [Cyclogenesis.] *Germany. Deutscher Wetterdienst, Berichte*, 4(22):91, **1956. DWB, DLC**—The author stresses the similarities between small vortical motions and cyclogenesis. He attempts to explain the physical basis of dust whirls, dust devils, wind and waterspouts, tornadoes, tropical cyclones and extratropical cyclones. *Subject Heading:* **1. Cyclogenesis.**—*I.L.D.*

9.6–161 551.515.13:551.543

Vasiukov, K. A., **Analiz lokal'nykh izmenenii davleniia i uslovii tsiklogeneza v troposfere.** [Analysis of local pressure variations and conditions of cyclogenesis in the troposphere.] *Moscow. Tsentral'nyĭ Institut Prognozov, Trudy*, 45(72):3–58, **1956.** 28 refs., 42 figs., 9 tables. 68 refs. **DLC**—This study attempts to examine the role of local variation in atmospheric pressure in cyclogenesis, in the light of contemporary theory on local atmospheric pressure changes. The formulas for local atmospheric change developed by B. D. Uspenskiĭ are applied to empirical data. The work is divided into six parts: (1) a concise review of various theoretical and empirical studies of local pressure changes in which the latter are considered either as the consequences of divergence of wind velocity or horizontal advection of vortical velocity; (2) the fundamental relations of the theory of local atmospheric pressure changes including the equations of vortical velocity and of vortical velocity for the mean level of the troposphere, transition from the equations of vortical velocity, the equations for determining $\partial H/\partial t$ the relationship between changes of the geopotential at height AT and vertical velocities in the atmosphere, and formulas for local pressure changes at the earth's surface; (3) results of analysis of actual local variations of geopotential heights of isobaric surfaces and of pressure near the ground surface, including the diagnostic and prognostic properties of formulas for determining local variations in the geopotential AT of different isobaric surfaces; (4) the relationship between the local variations of geopotential height, AT_{600} with temperature processes in the stratosphere; (5) analysis of the conditions of cyclogenesis in the AT_{700} field (6) analysis of daily variations of local pressure changes at the earth's surface. *Subject Headings:* **1. Pressure changes 2. Cyclogenesis 3. Diurnal pressure variations.**—*I.L.D.*

9.6–162 551.515.12(79)

§McQueen, H. R. and Thiel, G. D. (*both, Natl. Weather Analysis Center, U. S. W. B. Wash., D. C.*), **A cold low over the far western states August 1–5, 1956.** *Monthly Weather Review*, Wash., D. C., 84(8):313–328, Aug. **1956.** 12 figs., 6 tables, 19 refs., eqs. **DWB, DLC**—A comprehensive analysis of an unusual (for Aug.) cold low situation which persisted in the Pacific Northwest for 5 days (Aug. 1–5), causing unusually cold weather (15° to 25°F below

normal) and moderate to heavy precip. for that "usually dry" season. Antecedent conditions are shown by means of composite time and space charts. The development of the cut-off cold low, synoptic conditions during the period Aug. 1–5, dispersion of energy downstream, stability of air masses (area of instability spread from Western Oregon and Washington across the N.W.), thunderstorms, precip., temp. anomalies, thickness patterns, and tropopause (26,000 ft and −50°C on Aug. 1), are discussed and amply illustrated by a variety of charts and tabular data. *Subject Headings:* **1. Cold lows 2. Pacific Northwest.**—*M.R.*

9.6–163 551.515.2(261)

Davis, Walter R. (*U. S. W. B. Hurricane Forecast Center, Miami, Fla.*), **The 1956 hurricane season.** *Weatherwise*, Boston, 10(1):18–21, 32, Feb. **1957.** fig. **DWB, DLC**—The year 1956 was one of the lightest hurricane seasons on record—only 7 developed, 3 reached hurricane intensity and one for only a few hours. Six tropical depressions were also tracked. All storms were small and none intense except "Greta" (N.E. of Puerto Rico) for a short period. A description of conditions in 8 storms: 1) the tropical storm of June 12–14, 2) "Anna" (July 25–26), 3) "Betsy" (Aug. 9–19), 4) "Carla" (Sept. 5–14), 5) "Dora" (Sept. 10–12), 6) "Ethel" (Sept. 11–13), 7) "Flossy" (Sept. 21–30), and 8) "Greta" (Oct. 30–Nov. 7). Considerable damage was done in Puerto Rico by "Betsy." *Subject Headings:* **1. Hurricanes, 1956 2. North Atlantic.**—*M.R.*

9.6–164 551.515.2(261)

Dunn, Gordon E.; Davis, Walter R. and Moore, Paul L. (*all, Weather Bur. Off., Miami, Fla.*), **Hurricane season of 1956.** *Monthly Weather Review*, Wash., D. C., 84(12):436–443, Dec. **1956.** fig., table, 9 refs. **DWB, DLC**—Hurricanes were fewer in number and weaker in intensity during 1956 than usual. Only 8 tropical storms developed, only 4 reached hurricane intensity and only 2 reached the coast line of North America (both in the Gulf of Mexico). Case histories of each of the storms and a summary of damage and deaths, a chart showing tracks and discussion of the reason for the low number are presented. *Subject Headings:* **1. Hurricanes, 1956 2. North Atlantic.**—*M.R.*

9.6–165 551.515.2

Reichelderfer, F. W., **Hurricane warnings.** Wash., D. C., U. S. Weather Bureau, May **1956.** 4 p. Price: $.05 from U. S. Govt. Print. Off., Wash., D. C. figs. **DWB** (M15.2 I587hc)—A folder intended for public use showing how the hurricane warning service of the U. S. W. B. operates and listing safety precautions before a hurricane and safety measures to take after the storm. *Subject Headings:* **1. Hurricane warning service 2. Hurricane precautions.**—*M.R.*

9.6–166 551.515.3:551.556.4(747)

Embree, C. R., **Dust whirl on a quiet day, Syracuse, N. Y., March 28, 1957.** *Monthly Weather Review*, Wash., D. C., 85(3):88, March **1957. DWB, DLC**—Note on an unusual dust whirl, 25 ft in diameter and 35 ft high, with winds estimated at 50 mph or more, at 11:00 a.m. local time in downtown Syracuse, N. Y. Temp. was 51°F, dew point (at airport) 24°F and wind N.W. No other whirls or gusts were observed that day. *Subject Headings:* **1. Dust devils 2. Syracuse, N. Y.**—*M.R.*

RADIATION AND TEMPERATURE

RADIATION

See also: **Solar energy utilization, France** (Trombe), 9.6–84; **Solar proton radiation and auroral hydrogen lines** (Vegard), 9.6–288.

9.6–167 551.521:551.501.1

Kastrov, V. G., **Solnechnaia radiatsiia v troposfere v sluchae absoliutno chistogo i sukhogo vozdukha.** [Solar radiation in the troposphere in the case of absolutely clear and dry air.] *Moscow. Tsentral'naia Aerologicheskaia Observatoriia, Trudy*, No. 16:26–30, **1956.** 4 refs.,

4 tables, 6 eqs. **DLC**—New theory for computing solar-radiation intensity in absolutely pu and dry atmosphere, assuming that at great heights the atmosphere contains, besides pe manent gases, ozone equivalent to a 2.5 mm layer at normal pressure and temperature. It shown that pure atmosphere is 2–4% less transparent for solar radiation than was previous believed. The important divergence from LINKE's computations are explained by the fa that he did not take into consideration the anisotropy of air molecules and the absorption radiation by ozone. *Subject Heading:* **1. Radiation intensity measurement.**—*A.M.P.*

9.6–168 551.521:644

Nottage, H. B. (*Propulsion Research Corp.*) and Parmelee, G. V. (*ASHAE Res. Lab Cleveland*), **Circuit analysis applied to load estimating, Pt. 2, Influence of transmitted sol radiation.** *American Society of Heating and Air-Conditioning Engineers, Transactions*, 61:12 150, pub. **1956.** 11 figs., 9 tables. **DWB** (P A512sw)—Air conditioning loads arise from energy sources connected with weather: 1) sun and air temperature effect on outside wall 2) window temperature (warmed by sun and air); 3) direct solar radiation coming throug glass windows. All vary with time. Data for these factors are calculated from tests and a integrated to determine instantaneous loads by circuit method. For a room with norther exposure the peak instantaneous cooling load due to solar radiation through a window w found to be 75% of heat gain 3 hrs later. Constant room temperature is maintained. *Subje Heading:* **1. Radiation balance of houses.**—*M.R.*

9.6–169 551.521

*Böhm, Bedřich, **Normální hodnoty globálního záření.** [Normals of global radiation *Meteorologické Zprávy*, Prague, 10(1):6–8, **1957.** 4 figs., table, 2 refs., 5 eqs. Russian an German summaries p. 6. **DWB**—Average daily totals of global radiation are computed f Hradec Králové Observatory by means of ALBRECHT's empirical formula. *Subject Heading* **1. Global radiation calculation 2. Königgrayz, Czechoslovakia.**—*G.T.*

9.6–170 551.521.1:551.508.2

*L'vova, E. M., **Izmereniia summarnoĭ radiatsii solntsa i al'bedo zemli do vysoty 10–20 km** [Measuring total solar radiation and albedo of the earth to heights of 10–20 km.] *Moscow Tsentral'naia Aerologicheskaia Observatoriia, Trudy*, No. 16:31–38, **1956.** 3 refs., 3 table 5 figs. **DLC**—Methods and results of measurements carried out with 3 Tanislevsky pyra nometers (2 directed upward, 1 downward) at the Central Aerohydrodynamic Institute i 1953–1955 are presented and discussed. As a result of 4 flights a maximum intensity of tot solar radiation equal to 1.28 cal/cm²/min. at 48° of sun's height was obtained. The magnitud of the earth's albedo, and of the underlying air layer during clear sky, did not change muc with the height, and amounted to 10.5–18.3% (underlying surface—forests, fields and mead ows). Absorption of solar radiation to a 6 km height proved to be much greater than is give by computation of water vapor; this can be explained by absorption of radiation by dus *Subject Headings:* **1. Solar radiation measurement 2. Albedo of earth.**—*A.M.P.*

9.6–171 551.521.16:551.521.3

Dogniaux, R. (*Royal Inst. of Met., Belgium*), **Étude du climat de la radiation solaire e Belgique (suite et fin).** [Study of solar radiation climate in Belgium, Pt. 4, and conclusion *Ciel et Terre*, 70(9/10):324–344, Sept./Oct. **1954. DLC**—A popular technical discussion natural illumination, direct solar radiation in different wave lengths, sky light from variou portions of the sky, instruments for measuring illumination, diffuse radiation with clear an cloudy skies and natural daylight. Excellent charts and nomograms and many detaile calculation tables and illustrations are included. (For Pts. 1, 2 and 3, *see* 6.1–161, Jan 6.8–218, Aug., 6.9–172, Sept. 1955, *MAB*, respectively.) *Subject Headings:* **1. Illuminatio climatology 2. Solar radiation 3. Illumination meters 4. Sky light 5. Belgium.**—*M.R.*

9.6–172 551.521

Busbridge, I. W., **Finite atmospheres with isotropic scattering.** *Royal Astronomic Society, Monthly Notices*, 115(5):521–541, **1955.** 9 refs., numerous eqs. **DWB**—Son

transfer problems in plane parallel atmospheres of finite optical thickness τ_1 are considered, the scattering being isotropic with albedo $\varpi(0<\varpi\leqslant 1)$. The equations for CHANDRASEKHAR's X- and Y-functions are obtained by a simple mathematical method, an extension of one originally due to AMBARTSUMIAN. The same method is then used to obtain expressions for the emergent intensities at both faces of the atmosphere when there is thermal emission and when it is subject to incident radiation. *Subject Heading:* **1. Atmospheric transmission.**—*Author's abstract.*

9.6–173 551.521.31

Meyerott, Roland E., **Absorption coefficients of air from 6000°K to 18,000°K.** *Rand Corporation, Santa Monica, Calif., Research Memorandum* 1554, Sept. 9, **1955.** 4 p. 2 tables, 2 refs., 5 eqs. **DWB** (507.2)—Tables of coefficients. (*See* 9.6–12.) *Subject Heading:* **1. Absorption coefficients of air.**—*M.R.*

9.6–174 551.521.9

Thiessen, G., **Synchrotonstrahlung aus dem Crabnebel.** [Synchroton radiation from the Crab nebula.] *Naturwissenschaften*, 44(2):26–29, Jan. 15, **1957.** 4 figs., 19 refs., 9 eqs. **DWB**—The Crab nebula has an unusually strong continuum, making up >80% of all visible radiation, rather highly polarized. "Synchroton radiation," consisting of electrons strongly accelerated in a magnetic field, is suggested as the explanation. It is important because it shows for the first time that even in cosmic objects visible light can be produced by a synchroton mechanism. *Subject Heading:* **1. Radiation from nebulas.**—*C.E.P.B.*

TEMPERATURE

See also: **Soil moisture-tree growth relationships, Ontario** (Fraser), 9.6–82; **Statistical forecasting** (Roop), 9.6–123; **Glacial period temp. lowering, Europe** (Morawetz), 9.6–247.

9.6–175 551.524.35

Andrews, James F. (*Extended Forecast Section, U. S. W. B., Wash., D. C.*), **The weather and circulation of April 1957, a stormy month over the United States characterized by two contrasting temperature regimes.** *Monthly Weather Review*, Wash., D. C., 85(4):124–131, April **1957.** 8 figs., 3 tables, 11 refs. **DWB, DLC**—The first half of April, 1957 was abnormally cold in the eastern half of the U. S., the second half was unusually warm. Circulation conditions accounting for these anomalies are analyzed. *Subject Headings:* **1. Temperature anomalies 2. Eastern United States.**—*M.R.*

9.6–176 551.524.35

§Berkes, Zoltán, **1956 és 1957 februárjának ellentétes időjárása.** [Dissimilar weather in February 1956 and 1957.] *Időjárás*, Budapest, 61(1):51–52, Jan./Feb. **1957.** 3 figs. **DLC**—Comparative temperature curves for the winters 1955/56 and 1956/57 and synoptic charts (Europe and Atlantic) for Feb. 1956 and 1957 are presented and discussed. The near-record cold of Feb. 1956 (mean temp. −7.2°C) was followed by unusually mild weather in Feb. 1957 (+4.3°C). Thus the difference between the mean temperatures of these two successive Februaries was 11.5°C (a similar case occurred in 1842 and 1843, when the difference between Feb. mean temperatures was 13.6°C). The dissimilar temperature regimes of the two Februaries were reflected in the synoptic situations and general circulation patterns. The contrast between Feb. temperatures was not confined to Hungary. In the Moscow region it amounted to 18.5°C and in the Alpine region it exceeded 15°C. *Subject Headings:* **1. Temperature anomalies 2. Temperature comparisons 3. Synoptic charts 4. Europe 5. Atlantic.**—*G.T.*

9.6–177 551.524.35

Ludlum, David M., **Early winter turns on the heat—drought persists.** *Weatherwise*, Boston, 10(1):30–31, Feb. **1957.** 4 figs. **DWB, DLC**—Pressure was high all during Nov.

in the Western U. S. Not one cycle crossed the Pacific Coast S. of Alaska during that month. Dec. was hottest on record in S. Carolina and very warm all over the N., E., S. and S.W. parts. Rains were heavy in N. Pacific Coast and in S.E. *Subject Headings:* **1. Warm winters 2. South Carolina 3. Far West.**—*M.R.*

9.6–178 551.524.36

Lansing, Livingston, **New record.** *Weatherwise*, Boston, 10(2):61–70, April **1957. DWB**—Validity of an unofficial −55°F reading reported on Jan. 15, 1957 from Boonville, N. Y., radio station (elev. 1200 ft) is questioned by the cooperative observer who reported it. Error was due to minimum thermometer being taken indoors before reading, thus making it likely that index was disturbed. At the home of the author on Jackson Hill, 375 ft higher than the radio station, the minimum was only −27°F. Other readings of −35° and −40° are reported for the same day. *Subject Headings:* **1. Record low temperatures 2. Boonville, N. Y.**—*M.R.*

9.6–179 551.524.36

§McQueen, Henry R. and Pope, Cadesman, Jr. (*both, Natl. Weather Analysis Center, U. S. W. B., Wash., D. C.*), **The eastern states heat wave of April 20–28, 1957.** *Monthly Weather Review*, Wash., D. C., 85(4):132–139, April **1957.** 6 figs., table, 3 refs. **DWB, DLC**—During April 20–28, 1957, temp. records were equalled or broken all over the Eastern States (following a long, cold period) as shown by a table of 30 cities ranging from Maine to Georgia and west to Michigan. Details of weather, temp. and synoptic conditions are analyzed. In many places this was the longest as well as the most intense heat wave on record for April. Buffalo, N. Y., recorded a max. 31° above normal on April 25. *Subject Headings:* **1. Heat wave, Eastern U. S. (April 1957) 2. Record high temperatures 2. Eastern U. S.**—*M.R.*

9.6–180 551.524.36

Penzar, Ivo, **Diskontinuitet na krivulji opadanja temperature u vedrim noćima.** [Discontinuity of the cooling curve on cloudless nights.] *Zagreb. Sveučilište. Geofizički Institut, Radovi*, Ser. 3, No. 5, **1956.** 15 p. 4 figs., 3 tables, 9 refs. German summary p. 12–15. **DWB**—On clear nights a temporary interruption, or even reversal of the normal cooling of the air, can be observed at Zagreb (as it has been at other places). Monthly statistical data on the occurrence of this phenomenon at 3 stations in and near Zagreb at elevations from 116 to 1000 m (1950–1954) are presented and discussed. Explanations given by various authors for such discontinuities in night cooling are reviewed (heat released by dew formation, ending of plant transpiration, energy exchange between soil and atmosphere, turbulence) and none of them is found to be adequate. The author offers no theory of his own but believes that a number of factors, rather than a single one, is responsible for the discontinuity. *Subject Headings:* **1. Nocturnal cooling discontinuities 2. Zagreb, Yugoslavia.**—*G.T.*

9.6–181 551.524.36

Sauberer, F. and Dirmhirn, Inge (*both, Vienna*), **Weitere Untersuchungen über die Kaltluftansammlungen in der Doline Gstettner-Alm bei Lunz in Niederösterreich.** [Further investigations of cold air accumulations in the Gstettner-Alm depression near Lunz, lower Austria.] *Wetter und Leben*, Vienna, 8(8/11):187–196, **1956.** 3 figs., 3 refs. **DLC**—In the Gstettner-Alm depression exceptional minimum temperatures unusually low for Central Europe have been recorded. The observations reported in this article are primarily for the period Oct. 19–22 preceding the formation of the snow cover in Oct. 1954, carried out in order to observe conditions analogous to those present in the cooling of the snow cover. The accumulation of cold air was studied with the aid of thermographs and thermohygrographs at the ground surface; free air temperatures were measured by means of a nickel resistance thermometer attached to a captive balloon. Graphs giving the temperature recorded at the surface and of the free air, and data on the radiation balance above the Alm are presented. The processes of cold air accumulation are analyzed in terms of the temperature records. *Subject Headings:* **1. Extreme minimum temperatures 2. Cold air accumulation 3. Radiation balance 4. Lunz, Austria.**—*I.L.D.*

SOIL TEMPERATURE

See also: **Soil moisture-tree growth relationships, Ontario** (Fraser), 9.6–82.

9.6–182 551.525:551.579

*Yakuwa, R. **Studies on the soil temperatures.** Sapporo, Japan, Sept. **1954.** (12 p.) 9 figs., 10 eqs. **DWB** (M25.2 Y15s)—The author presents a mathematical and theoretical treatment of the thermal properties of soil temperature: the effect of various soil conditions upon soil temperature, including surface cover, mulches, snow cover, shallow water, soil moisture, soil types and soil dressing; time of occurrence of maximum soil temperature, heat exchange between the soil surface and atmosphere, heat propagation in a soil through which water penetrates; and condition of heat through soil upon which is superposed dressed soil. Graphs illustrate these various aspects of the thermal properties of soil. *Subject Headings:* **1. Soil temperatures 2. Soil moisture 3. Soil-air heat exchange 4. Thermal properties of soil.**—*I.L.D.*

9.6–183 550.3:551.525.5

†Joesting, H. R. (*U. S. Geol. Survey*), **Geophysical exploration in Alaska.** *Arctic*, Montreal, 7(3/4):165–175, **1954.** 31 refs. **DLC**—Seismic, electrical resistivity and magnetic methods of geophysical exploration, especially in permafrost areas such as the goldfields near Fairbanks, are discussed at some length. Ground water, depth of top and bottom of permafrost layers, or of ice layers on land or sea, oil strata, etc., can be determined by such methods. Aerial reconnaissance for radioactive minerals, volcano research and future research problems are outlined and discussed. Thermal diffiusivity, temp. changes over years, adaptation of equipment for use in low temperatures and effect of crust of earth on atmospheric electricity, ionosphere, cosmic rays, geomagnetism and aurora are among fields for investigation. *Subject Headings:* **1. Permafrost 2. Geophysical research 3. Alaska.**—*M.R.*

9.6–184 551.525.6:622.26:550.361

Clark, Sydney P., Jr. (*Dunbar Lab., Harvard Univ., Camb., Mass.*), **Heat flow at Grass Valley, California.** *American Geophysical Union, Transactions*, 38(2):239–244, April **1957.** fig., 3 tables, 14 refs., 10 eqs. **DWB, DLC**—Geothermal gradients, corrected for the effect of topographic irregularities, are calculated from the measurements of underground temperatures in the mines at Grass Valley, Calif. The gradient is 9.46 ± 0.16°C/km for indefinitely persisting topography and 8.56 ± 0.16°C/km if the topography has evolved in the last 10^6 years. The mean thermal conductivity of 14 specimens of granodiorite from Grass Valley is $7.68\pm0.09\times10^{-3}$ cal/cm sec °C; that of 15 specimens of porphyrite is $7.14\pm0.14\times10^{-3}$ cal/cm sec °C. Using the conductivity of the granodiorite, the heat flow is found to be $0.73\pm0.01\times10^{-6}$ cal/cm² sec and $0.66\pm0.01\times10^{-6}$ cal/cm² sec for the two physiographic histories assumed. No explanation of this low value can be deduced from this isolated determination. A simplified form of correction for the effect of topographic irregularities on underground temperatures is presented. *Subject Headings:* **1. Mine temperatures 2. Geothermal gradient 3. Topographic effects 4. Grass Valley, Calif.**—*Author's abstract.*

PRESSURE AND WIND

PRESSURE

See also: **Cyclogenesis and pressure changes** (Vasiukov), 9.6–161; **Upper air pressure** (Malkowski), 9.6–293.

9.6–185 551.543

*Natario, Agostinho Pereira (*Chief Met. of Service*), **Tendência barométrica.** [Barometric tendency.] *Macao. Serviço Meteorológico, Notas Científicas*, No. 10, **1957.** 14 p. 2 figs., 3 tables. Legends in English and Portuguese; English summary p. 7. **DWB**—A study of the hourly or diurnal variation of pressure and of pressure tendency at Macao for each month of the year during 1931–39 and 1950–55 (15 years in all), accompanied by tables, charts and graphs. There are two maxima (10 h and 23 h) and two minima (04 h and 16–17 h), whereas

the pressure change (tendency) has its maxima at 06–09 h and 18–21 h, and two minima at 00–03 h and 12–15 h. *Subject Headings:* **1. Pressure changes, Macao 2. Macao.**—*M.R.*

GUSTINESS AND TURBULENCE

See also: **Surface winds, Arctic** (Wilson, Markham), 9.6–27; **High altitude flying conditions, Asia,** (Timofeev), 9.6–77; **Calculation of moisture and thermal balance** (Rauner), 9.6–152; **Turbulence coefficient calculations** (Budykov), 9.6–154; **Nuclei effects on potential gradient** (Israël), 9.6–278.

9.6–186 551.551:628.53

Milly, George H. (*Chemical Corps Operations Res. Group, Army Chemical Center*), **Appraisal of approaches to the turbulent diffusion problem.** (In: U. S. Dugway Proving Ground **Symposium on micrometeorology turbulent diffusion, June 28–29, 1954. 1956.** p. 92–100.) **DWB**—A general discussion of mathematical and statistical problems (grids, methods of sampling and correlation, etc.) involved in prediction of ground dosages of stack effluents. *Subject Headings:* **1. Turbulent diffusion analysis 2. Diffusion of stack effluents 3. Stack meteorology.**—*M.R.*

9.6–187 551.551:519.24

Siegel, Armand (*Dept. of Physics, Boston Univ.*), **Stochastic basis of the Eulerian variational principle in linear dissipative processes.** *Physical Review,* N. Y., 106(4):609–615, May 15, **1957.** foot-refs., 44 eqs. **DLC**—The application of the Eulerian variational method to the Onsager Lagrangian of a linear dissipative process implies that variables undergoing strong spontaneous fluctuations (i.e., following curves other than the characteristic exponential decay from a given initial value) obey, on a macroscopic time scale a simple differential equation which also describes the more usual exponential decay curve. To justify this, from the stochastic model of such processes suggested by Onsager and Machlup (according to which the variable obeys the Langevin equation), requires that two things be proved: (1) As a necessary condition, that the stochastic curves under the given conditions do indeed cluster strongly about the solution of the differential equation. (2) As a sufficient condition, that the approximate time integral (actually obtained as a finite sum) of the Onsager Lagrangian be close to its relative minimum, for a time subdivision that is fine in the macroscopic sense. (1) is proved by deriving the conditional probability density of the Langevin variable at a time intermediate between two other times, given the values of the variables at these times. The proof of (2), which utilizes this distribution function, follows lines similar to the more special case previously treated by the author. *Subject Heading:* **1. Statistical theory of turbulence.**—*Author's abstract.*

9.6–188 551.551.25:551.508.51

Jones, J. I. P. and Butler, H. E. (*both, Met. Sec., Chemical Defence Exper. Establ., Porton Down, Wilts.*), **The measurement of gustiness in the first few thousand feet of the atmosphere.** *Royal Meteorological Society, Quarterly Journal,* 84(359):17–24, Jan. **1958.** 6 figs., 2 refs. **DWB, DLC**—A description is given of instruments which have been designed and used to measure gustiness, in the form of inclination and total speed of the wind, from a position on the cable of a captive balloon. A light-weight wind vane with automatic compensation for tethering cable angle, and a sensitive vane airmeter are used as sensing heads. The data, with reference signals, are relayed by electric cable to ground level and recorded on multi-channel recorders. Both instruments have good response to wind fluctuations with periods down to one second. A brief account is given of some observations made at Cardington, Beds., and some examples are presented of records made at 1000, 2000 and 3000 ft in contrasting meteorological conditions. *Subject Headings:* **1. Gustiness measurement equipment 2. Wind vanes.**—*Authors' abstract.*

WIND VARIATIONS AND WIND EFFECTS

9.6–189 551.553

*Myers, Vance A. (*Hydromet. Sec., U. S. W. B.*), **Comparison of Nantucket Island wind speeds with open water wind speeds.** Wash., D. C., U. S. Weather Bureau, Dec. 1956. 9 p.

figs., table, 2 refs. Mimeo. **DWB** (M55/74 U587c)—In order to determine whether or not the wind speed reduction factor of 0.89 for land winds as compared with those over water (Lake Okeechobee, Fla.—*U. S. W. B. Hydromet. Report*, No. 32, 1954) was reasonable, automatic wind records for Nantucket W.B.O. (41°17′N, 70°06′W, anemometer 90 ft above ground), and for Nantucket Shoals Light Ship (40°37′N, 69°37′W, 24 ft) 49 mi S.S.E. of the Nantucket W.B.O. for 1916–1918, were compared. Values of ratios were found to vary greatly with wind direction and synoptic situation, but on the whole the 0.89 reduction factor seems reasonable. Sometimes winds were stronger on leeward than on windward side of an obstruction. *Subject Headings:* **1. Roughness effects of wind speed 2. Nantucket, Mass.**—*M.R.*

9.6–190 551.556.4:551.583.3:551.311.3

Plesník, Pavol, **Vplyv vetra na vznik a vývoj neiktorých foriem periglaciálnych pôd vo východnej polovici Belanských Tatier.** [Effect of wind on the formation and development of some periglacial soil formations in the eastern part of the Belanské Tatry.] *Geografický Časopis*, Bratislava, 8(1):42–64, **1956.** 6 photos, 3 figs. Russian and German summaries p. 60–64. **DLC**—There are several types of periglacial soil formations in the brush vegetation belt of the Tatra Mountains, although their occurrence is comparatively rare in those latitudes. In this paper two such forms ("garlands" and smooth surfaces) are described. They are of recent origin, their formation having been made possible mostly by human activity (deforestation, pasture). Wind exerts a two-fold action on these soil formations, by blowing off the snow and thus exposing the surface to alternating frost and thaw, and by direct erosion. The structure of these formations found in the eastern Tatra Mountains is analyzed (photographs and diagrams presented) in relation to slope orientation, wind direction, insolation and other factors. *Subject Headings:* **1. Periglacial soil formations 2. Wind erosion 3. Tatra Mountains.**—*G.T.*

9.6–191 551.556.1:62(52)

Takahashi, K., **An operational research on disasters concerned with storms in Japan.** *Journal of Meteorological Research*, Tokyo, 9(1):1–34, March **1957.** 10 figs., 41 tables, 43 refs., 57 eqs. In Japanese, English summary p. 1. **DWB, DLC**—Pt. I. An operational research concerned with disasters was made, assuming that: (a) frequency distribution of a destructive force is expressed by an exponential function, (b) each destructive force appears at random, (c) a construction is destroyed when destructive force is stronger than the strength of the construction. The results are as follows. 1) Expectancy of the N year maximum value of the destructive force $F(MN)$ is given approximately by

$$F(MN) = \{0.577 + \log\,(MN-1)\}f_0,$$

where MN is the number of the destructive forces in N years and f_0 mean values of the destructive forces. 2) The most economic design value of the destructive force is derived in following 2 cases, i.e., (a) the strength of the construction is constant during a certain time interval L and after L is O, (b) the strength of the construction decreases linearly with the lapse of time. For the solution of the second case, the so called Monte Carlo method is used. It is found that the design value is several times larger than the mean annual maximum value of destructive force depending on the age of the construction. 3) The relation between the percentage amount of damage and the value of destructive force is calculated. The relation is expressed approximately by a power formula within the wide region of the destructive forces. This agrees well with the experience. 4) The efficiency of the disaster warning is calculated. Pt. II. Statistical characteristics of storm damage in Japan have been calculated and the results are as follows: 1) The frequency distribution of the damage is skewed—on rare occasions an enormous amount of damage occurs during one disaster which occupies a large part of the total amount of the damage. 2) Annual mean values of various meteorological disasters have been calculated and it is found that the amount of damage due to typhoons is most important. 3) Annual mean values of storm damage in Japan is calculated by prefectures and meteorological causes. 4) 4, 6.58 and 60 year-periodicities are found in the time variation of the annual amount of damages. Pt. III. Various statistics of storms in Japan are calculated, with the following results: 1) Annual mean number of storms in Japan by month and district; 2) Extreme and mean value of maximum wind speed in a year at various stations; 3) The most

economic design wind speed is calculated; 4) Extreme, mean value of annual as well as 5 year maximum amount of precipitation at various stations and depth-area precipitation values; 5) The most economic design amount of the precipitation. *Subject Headings:* **1. Storm damage 2. Building resistance 3. Japan.**—*Author's abstract.*

9.6–192 551.556.8:551.482:551.579.4

Schmitz, H. P., **Zur Ermittlung der Durchflussmengenänderung in Kanälen und Flüssen infolge zeitlich variabler Windeinwirkung.** [Determination of canal and river discharge variations caused by time-variable wind effects.] *Acta Hydrophysica*, Berlin, 3(1):5–23, **1955.** 5 refs., 51 eqs. **DLC**—Application of hydrodynamics to the idealized case of an infinite straight channel without changes in cross section and with constant slope. Even in such a case, the derivation of equations for the effect of tangential surface stresses introduced by the wind becomes quite elaborate. The final result depends on two empirical constants α and β which have to be determined experimentally possible in selected profiles. Anticipated relations for α and β are given. *Subject Headings:* **1. Wind effects on river discharge 2. River flow.** —*A.A.*

AQUEOUS VAPOR, HYDROMETEORS AND HYDROMETEOROLOGY

HUMIDITY AND EVAPORATION

See also: **Evaporation data, Nyasaland,** 9.6–44; **Hydrological cycle in nature** (Schmuck), 9.6–239.

9.6–193 551.571:551.594.253

Arai, Bunji, **Effects of humidity on Lichtenberg figures.** *Yokohama, Japan. National University, Science Reports*, Sec. 1, No. 5:16–26, Sept. **1956.** 7 figs., table, 7 refs. **DLC**—The climate in the eastern half of Japan is humid in summer and dry in winter. The writer tried to inquire into the effect of such climatic conditions on the klydonograph or Lichtenberg figure. Crest voltage from the radius of a Lichtenberg figure varies according to different sources from ±15% to ±35%. The author investigated the effect of humidity on such variations under laboratory conditions. Lichtenberg figures were found to contract with increasing humidity. At absolute humidities of 25–30 g/m³ the rate of contraction was 10–30% in the positive and 10–20% in the negative figures. *Subject Headings:* **1. Humidity effects on corona discharges 2. Corona discharges.**—*From author's abstract.*

CONDENSATION

See also: **Cloud physics textbooks** (Mason), 9.6–3; **Cloud physics conferences** (Houghton), 9.6–47; **Aircraft icing prevention** (Bowden), 9.6–76; **Radar precipitation meas.** (Atlas), 9.6–93; **Chemical composition of atmospheric particles** (Vittori-Antisari), 9.6–137; **Drop size distribution in cumuli and tropical clouds** (Battan, Reitan), 9.6–207; **Ice crystal growth and radar snow obs.** (Douglas), 9.6–226; **Nuclei effects on potential gradient** (Israël), 9.6–278.

9.6–194 551.574.1

Anderson, Charles E. (*Geophys. Res. Dir., Cambridge, Mass.*), **Diffusional growth problems in cloud physics.** (In: Conference on the Physics of Cloud and Precipitation Particles, Sept. 1955, **Proceedings.** Pub. N. Y., Pergamon Press, **1957.** p. 153–160, 1 fig., 1 table, 11 refs. eqs.) **DLC** (QC921.5.U5), **DWB**—The growth of cloud droplets by diffusion is examined with the new theory of FRISCH and COLLINS and the proper form of the steady-state growth law is shown to be $y[R(t)-R_0]+\frac{1}{2}[R^2(t)-R_0^2]=kDat$ instead of $R^2-R_0^2=2kaDt$ as normally used in meteorology. Using experimentally determined growth rates, the condensation coefficient of water on a water droplet is found to be 0.5 when the Frisch and Collins theory is applied. Finally, the question of the heat balance of growing drops is discussed and it is shown that unreasonably high temperature rises are found in the cases of rapid growth. *Subject Heading:* **1. Cloud drop growth.**—*Author's abstract.*

9.6–195 551.574.1

Anderson, Charles E. (*Geophys. Res. Dir., Cambridge, Mass.*), **Studies on re-evaporation ice nuclei.** (In: Conference on the Physics of Cloud and Precipitation Particles, Sept. 1955, **Proceedings.** Pub. N. Y., Pergamon Press, **1957.** p. 404–408. 1 fig., 1 table, 4 refs.) **DLC** (QC921.5.U5), **DWB**—The critical supersaturation ratio for the formation of ice crystals from water vapor on foreign nuclei was experimentally studied over the temperature range −24 to −44°C and was determined to be below 1.3 over this range. Individual determinations demonstrated conclusively that ice crystal formation can proceed at vapor pressures considerably less than the saturation value with respect to water. *Subject Heading:* **1. Ice crystal formation temperature.**—*Author's abstract.*

9.6–196 551.574.1

Birstein, S. J. (*Geophys. Res. Dir., Cambridge, Mass.*), **The role of adsorption in water condensation.** (In: Conference on the Physics of Cloud and Precipitation Particles, Sept. 1955, **Proceedings.** Pub. N. Y., Pergamon Press, **1957.** p. 145–152. 7 figs., table.) **DLC** (QC921.5.U5), **DWB**—The work of various investigators is discussed in an attempt to determine what effect, if any, the chemical composition of condensation nuclei has on the supersaturation ratio necessary for water droplet formation. Gendron, using a diffusion cloud chamber, found that various nuclei became active at different supersaturation ratios. Anderson, using a kinetic system, has found a marked difference in the saturations at which sodium chloride and silver iodide will cause water droplet formation. Birstein, in a study of the adsorption isotherms of water vapor on various salts, has found that different materials take up water vapor in different ways. It is concluded that chemical composition of the nuclei plays an important part in water droplet formation. *Subject Headings:* **1. Adsorption on nuclei 2. Nuclei effectiveness.**—*Author's abstract.*

9.6–197 551.574.1

Birstein, S. J. (*Geophys. Res. Dir., Cambridge, Mass.*), **Studies on the effects of certain chemicals on the inhibition of nucleation.** (In: Conference on the Physics of Cloud and Precipitation Particles, Sept. 1955, **Proceedings.** Pub. N. Y., Pergamon Press, **1957.** p. 376–385. 5 figs., 1 table, 7 refs.) **DLC** (QC921.5.U5), **DWB**—Studies have been made in the laboratory and in the field on the use of certain chemicals to inhibit nucleation. It has been found that chemicals of the type that form co-ordination complexes with heavy metals are the most effective in inhibiting ice crystal formation. Methyl amine and ethyl amine, the compounds investigated most thoroughly, both inhibit silver iodide nucleation below −40°C, the temperature of "spontaneous" nucleation. These two agents appear equally effective on natural type ice nuclei. The results of the "poisoning" studies are analyzed to gain an insight into the mechanism of the reaction, and it is concluded that specific surface compounds are formed on the nucleating agents and, as the nucleating surface is altered, ice-forming ability is diminished. *Subject Heading:* **1. Nuclei effectiveness.**—*Author's abstract.*

9.6–198 551.574.1

Byers, Horace R.; Sievers, John R., and Tufts, Barbara J. (*Dept. of Met., Univ. of Chicago*), **Distribution in the atmosphere of certain particles capable of serving as condensation nuclei.** (In: Conference on the Physics of Cloud and Precipitation Particles, Sept. 1955, **Proceedings.** Pub. N. Y., Pergamon Press, **1957.** p. 47–72. 26 figs., 15 refs.) **DLC** (QC921.5.U5), **DWB**—Collections of chloride particles on flights in Illinois and in the Lower Mississippi Valley are compared with those made in Puerto Rico and some ground data. Large chloride particles are numerous at flight altitudes even though scarce at the ground in the interior of the continent. Giant particles giving the sulfate and magnesium reaction appear to be somewhat more numerous than the chlorides. The previous air trajectory does not seem to have a very great effect on the counts. *Subject Headings:* **1. Nuclei geographical distribution 2. Chloride nuclei 3. Puerto Rico.**—*Authors' abstract.*

9.6–199 551.574.1

Fournier d'Albe, E. M. (*Inst. de Ciencias Aplicadas, Univ. Nac'l. de México*), **Some observations of the geographical distribution of giant hygroscopic nuclei.** (In: Conference

on the Physics of Cloud and Precipitation Particles, Sept. 1955, **Proceedings.** Pub. N. Y. Pergamon Press, **1957.** p. 73–80. 4 figs., 1 table, 6 refs.] **DLC** (QC921.5.U5), **DWB**— The concentration and size distribution of giant hygroscopic nuclei in the surface air wa measured twice weekly throughout a period of two years at five stations in West Pakistan The results suggest that the sea surface and coasts are the only important source of suc particles in this area. The loss of particles by fall under gravity is negligible except for thos of mass greater than 10^{-9} g, and the main agent in their removal from the atmosphere appear to be precipitation. On the other hand, the evaporation of rain or large cloud droplets ma produce locally high concentrations of giant nuclei. Some measurements have also bee made in Mexico which tend to support these conclusions. *Subject Headings:* **1. Nuclei geo graphical distribution 2. Hygroscopic nuclei 3. West Pakistan.**—*Author's abstract.*

9.6–200 551.574.1:551.510.4

Hosler, C. L. and Spalding, G. R. (*Penn. St. Univ., Univ. Park, Pa.*), **The effect of con densation nucleus size and type on the temperature of ice crystal formation in clouds.** (In Conference on the Physics of Cloud and Precipitation Particles, Sept. 1955, **Proceedings** Pub. N. Y., Pergamon Press, **1957.** p. 369–375. 3 tables, 6 refs.) **DLC** (QC921.5.U5) **DWB**—Eight compounds have been used to determine the role that the size and compositio of the nuclei play in regulating the temperature at which ice crystals form in a cloud produce in an expansion chamber. Helium, nitrogen, and air were used as carrier gases. Insolubl nuclei all show an increase in freezing temperature with increased nucleus size. Solubl nuclei show a more complex relationship based on the concentration of the solution formec The meaning of the results is discussed. *Subject Headings:* **1. Nuclei effectiveness 2. Ice crystal formation temperature.**—*Authors' abstract.*

9.6–201 551.574.1:551.510.4

Junge, Christian E. (*Geophys. Res. Dir., Cambridge, Mass.*), **Facts and problems of chemi cal composition of condensation nuclei in unpolluted and polluted atmospheres.** (In: Con ference on the Physics of Cloud and Precipitation Particles, Sept. 1955, **Proceedings.** Pub N. Y., Pergamon Press, **1957.** p. 31–35. 3 tables, 8 refs.) **DLC** (QC921.5.U5), **DWB**—Sea spray particles seem to have the same chemical composition as sea water, but it is an ope question if they are not decomposed over land. Nitrate is found predominantly in particle above 1μ radius. The possible source and formation process is discussed. Ammonium an sulfate are found predominantly in particles below 1μ radius. The possible sources an formation processes are discussed. *Subject Headings:* **1. Nuclei sources 2. Nuclei in pollute air.**—*Author's abstract.*

9.6–202 551.574.

Junge, Christian E., **Remarks about the size distribution of natural aerosols.** (In Conference on the Physics of Cloud and Precipitation Particles, Sept. 1955, **Proceedings** Pub. N. Y., Pergamon Press, **1957.** p. 3–17. 9 figs., 10 refs., eqs.) **DLC** (QC921.5.U5)— An explanation of certain features of the size distribution of natural aerosols is presente It can be shown that the lower limit of the particle-size distribution (about 0.01μ radius) i caused by coagulation and the upper size limit (about 20μ radius) by precipitation by gravity Observations and calculations are in agreement. The almost constant log volume distributio in the radius range between 0.1 and 10μ, observed over the continents, is tentatively explaine by a large-scale mixing process. The profound differences between the size distribution ove continent and ocean are pointed out. *Subject Headings:* **1. Nuclei size distribution 2. Nucle over oceans.**—*Author's abstract.*

9.6–203 551.574.

Junge, Christian E. (*Geophys. Res. Dir.*), **Some facts about meteoritic dust.** (In: Confer ence on the Physics of Cloud and Precipitation Particles, Sept. 1955, **Proceedings.** Pub N. Y., Pergamon Press, **1957.** p. 24–30. 1 fig., 2 tables, 14 refs., eq.) **DLC** (QC921.5.U5) **DWB**—A brief review is given of recent papers one meteoritic dust in an effort to substantiat Bowen's theory of periodic rain due to a large-scale natural seeding process. The presen knowledge of the size distribution of meteoritic dust particles in the atmosphere makes i

difficult to find sufficient proof for BOWEN's theory. *Subject Headings:* **1. Meteoric dust effects on rainfall 2. Bowen's meteoric dust theory.**—*Author's abstract.*

9.6–204 551.574.1

Junge, Christian E. (*Geophys. Res. Dir., Cambridge, Mass.*), **The vertical distribution of aerosols over the ocean.** (In: Conference on the Physics of Cloud and Precipitation Particles, Sept. 1955, **Proceedings.** Pub. N. Y., Pergamon Press, **1957.** p. 89–96. 6 figs., eqs.) **DLC** (QC921.5.U5), **DWB**—Recent observations of sea-spray at various altitudes over the ocean by WOODCOCK, MOORE, LODGE and others are compared, and the major features discussed. They can be explained satisfactorily as a nonsteady case of eddy diffusion. *Subject Headings:* **1. Nuclei vertical distribution 2. Nuclei over oceans 3. Sea spray.**—*Author's abstract.*

9.6–205 551.574.41:551.508.8

*Iowa. State College. Agronomy Dept., **Research directed toward the observation of dew deposition on various types of cover.** Contract AF 19(604)-589, Progress Report, No. 2, April 1–June 30, **1953.** 4 p. numerous tables, fig. **DWB**—Observations of dew deposition were started during the quarter. These were recorded at different heights over grass, oats, soybeans, corn and bare ground. Hourly amounts of dew were recorded during the night, concomitant with visual wind and cloud cover observations. Hygrothermographs were installed in each of the crop covers. *Subject Heading:* **1. Dew measurement.**—*Author's abstract.*

FOG

See also: **Fog drip, San Francisco, Calif.** (Oberlander), 9.6–232.

9.6–206 551.575.5

§Nurminen, Aili (*Finnish Met. Off., Helsinki*), **Unexpected occurrence of fog.** *Geophysica*, Helsinki, 6(1):36–44, **1957.** 7 figs., 7 refs. **DLC**—A synoptic-aerological case history study of a situation on Sept. 12–13, 1955 when extensive areas of fog formed rapidly over southern Finland at the place where the anticyclonic curvature of the isobars in a retreating anticyclonic ridge changed to cyclonic curvature. Microsynoptic analysis of the Scandinavian area, with isobars drawn for 1 mb intervals and Helsinki radiosonde ascents, plus data extracted from supplementary airways observations at Helsinki airport, support the study. *Subject Headings:* **1. Synoptic case histories 2. Fog studies for Finland 3. Southern Finland.**—*M.R.*

9.6–207 551.576.11:551.574.1

Battan, Louis J. and Reitan, Clayton H. (*Dept. of Met., Univ. of Chicago*), **Droplet size measurements in convective clouds.** (In: Conference on the Physics of Cloud and Precipitation Particles, Sept. 1955, **Proceedings.** Pub. N. Y., Pergamon Press, **1957.** p. 184–191. 7 figs., table, 5 refs.) **DLC** (QC921.5.U5), **DWB**—Curves showing mean droplet size distributions in fair weather cumuli and cumulus congestus clouds over the central U. S. and in tropical cumuli are presented. The data are compared with measurements of other investigators. Droplet size distribution and liquid water content in fair weather cumuli are considered in some detail. *Subject Headings:* **1. Cumulus cloud structure 2. Drop size distribution in cumuli 3. Liquid water content of clouds 3. Tropical clouds.**—*Authors' abstract.*

9.6–208 551.574.1:551.576.11

Cunningham, Robert M. (*Geophys. Res. Dir., Cambridge, Mass.*), **A discussion of generating cell observations with respect to the natural existence of freezing or sublimation nuclei.** (In: Conference on the Physics of Cloud and Precipitation Particles, Sept. 1955, **Proceedings.** Pub. N. Y., Pergamon Press, **1957.** p. 267–270. 4 figs., 2 refs.) **DLC** (QC921.5.U5), **DWB**—The question of whether the water phase is involved in all natural condensation processes is discussed with respect to aircraft soundings in storm areas over the past ten years. It is concluded that clouds appearing for the first time at temperatures warmer than about −40°C always start out as a water cloud. A special case of infection of an updraft by a cirrus haze, preventing the water phase, is illustrated by photographs taken during a flight.

Subject Headings: **1. Condensation processes 2. Sublimation 3. Cloud formation.**—*Author's abstract.*

9.6–209 551.576.11:551.511

*Matveev, L. T. and Kozharin, V. S., **Rol' turbulentnogo peremeshivaniia v formirovanii struktury sloistoobraznykh oblakov, I.** [Role of turbulent mixing in the formation of the structure of stratiform clouds, Pt. 1.] *Akademiia Nauk SSSR, Izvestiia, Ser. Geofiz.*, No. 11:1338–1353, **1956.** 13 figs., 8 tables, 6 refs., 18 eqs. **DLC**—Experimental data on the water content of stratiform clouds are analyzed. The characteristics of the distribution of water content with altitude in St-Sc-Ac and Cs clouds are classified. The dependence of water and vertical gradient upon vertical thermal stratification and air temperature is established. In order to explain the characteristic properties of stratiform clouds, there was established a theory of the transformation of the field of humidity and water content in air masses undergoing mixing. Formulas obtained for the heights of the lower levels of clouds agree satisfactorily with actual data. *Subject Headings:* **1. Stratiform cloud formation 2. Turbulent mixing.**—[*Abstract of author's abstract*], *I.L.D.*

PRECIPITATION

See also: **Ecology textbooks** (Weaver), 9.6–6; **Rainfall intensities, Germany** (Gegenwart), 9.6–10; **Radar obs. and precipitation echoes** (Cena), 9.6–91; **Radar precip. meas.** (Atlas), 9.6–93; **Rainfall data, Bombay** (Mann), 9.6–104; **Flood producing storms and cold pools, Mediterranean** (Ward), 9.6–124; **Hydrological cycle in nature** (Schmuck), 9.6–239.

9.6–210 551.577:551.506(95)

*Netherlands New Guinea. Meteorologisch en Geofysisch Bureau, Hollandia, **Regenval van Nederlands Nieuw Guinea.** [Rainfall in the Netherlands New Guinea], [**second quarter**], **1956.** issued April 1, **1957.** each section repaged. Almost entirely tables. **DWB**—Decadal and monthly totals of precipitation for over 400 stations are tabulated by months and the greatest and second greatest daily total for each month given for each station. Stations are grouped by regions and arranged by index numbers in each region. *Subject Headings:* **1. Monthly rainfall data 2. Netherlands New Guinea.**—*M.R.*

9.6–211 551.577:551.579(595)

†*Watts, I. E. M., **Rainfall of Singapore Island.** *Malayan Journal of Tropical Geography*, Singapore, Vol. 7, Dec. **1955.** 37 figs., 16 tables, 43 refs. **DWB**—All available rainfall data for Singapore Island are analyzed in numerous ways in this monograph, to show the nature and causes of variations (geographical, diurnal, seasonal, year-to-year, long period and storm-to-storm, land-to-sea, etc.). Mean annual rainfall varies from 83″ in the south to >115″ in the north. The seasonal variation is due to changes in upper winds. In Dec.–March, rains occur most often in the afternoon, but in Sept. and Oct. between 06 and 08h, with little variation from place to place or over land and sea. Separate storms are usually circular in pattern and 6–11 mi wide, few last over one hour. At least 5 gages must be used to adequately describe rainfall regime of the island. Data presented in elaborate statistical or engineering (hydrological) type of tables or charts. *Subject Headings:* **1. Rainfall data 2. Hydrometeorological studies 3. Tropical rainfall regime 4. Singapore Island.**—*M.R.*

9.6–212 551.577.1

Weickmann, Helmut (*Evans Sig. Lab., Belmar, N. J.*), **A nomogram for the calculation of collision efficiencies.** (In: Conference on the Physics of Cloud and Precipitation Particles, Sept. 1955, **Proceedings.** Pub. N. Y., Pergamon Press, **1957.** p. 161–166. 3 figs., 6 refs., eqs.) **DLC** (QC921.5.U5), **DWB**—ALBRECHT's formula of collision efficiency can be presented as nomogram. It is thus possible to obtain a qualitative picture for the collision efficiencies of different types of precipitation particles. *Subject Heading:* **1. Hygrometeor collision efficiency.**—*Author's abstract.*

9.6–213 551.577.11:551.576

East, T. W. R., **Precipitation mechanisms in convective clouds.** McGill Univ. Macdonald Physics Laboratory. Stormy Weather Research Group, Contract AF 19(122)-217

Scientific Report, No. MW-22, Jan. **1956.** 74 p. 19 figs., 3 tables, 38 refs., 49 eqs. **DWB.** Shorter version in: Conference on the Physics of Cloud and Precipitation Particles, Sept. 1955, **Proceedings.** Pub. N. Y., Pergamon Press, **1957.** p. 192–201. 6 figs., 2 refs. **DLC** (QC921.5.U5)—In a fair-weather cumulus, the largest droplets, which are 18 microns radius, grow too slowly by differential settling to become precipitation (although the time to reach raindrop size from 50 microns, for instance, would be comparatively short). Even at 18 microns their terminal speed is sufficient for growth, were it not that most of the droplets they encounter are small enough to avoid capture. Using LANGMUIR's collision efficiencies, the calculated time from 18 to 50 microns radius is 2 hrs. This time would be reduced to 12 min if the cloud sample had first ascended until there were 4 grams of condensed water per kg of air, as must take place in the updraft of a Cumulus Congestus. Condensation and coalescence actually occur simultaneously and the first 50 micron droplets appear at the 6 g/kg level; this is about the level at which the first radar echo should, and does, appear. The apparent descent of the echo can be accounted for by droplet growth at lower levels. The rapid development of precipitation in Cumulus can be explained thus without invoking giant nuclei or ice. The intensity required for turbulence to be a potent coalescing agency was found to be a factor ten greater than the intensity of turbulence deduced from aircraft measurements. *Subject Headings:* **1. Precipitation mechanism 2. Raindrop growth 3. Drop formation in convective clouds.**—*Author's abstract.*

9.6–214 551.577.3(689)

*Chaplin, J. H., **On some aspects of rainfall in Northern Rhodesia, Pt. 2, (1955?)**, Separated sheets from *Northern Rhodesia Journal*, p. 16–23, (Vol. and year not given). Latest data cited, 1954. figs., table (fold.), refs.—Data for 131 rainfall stations in N. Rhodesia, dating back in some instances as far as 1885–1900, are tabulated in a graphic manner to show the variability of rainfall in this vast area (lowest annual = 8.82", highest = 88.46") and the seasonal rise of the rivers (difference in height between minimum in October or November and peak of flood). Zambesi and Kafue from 1905–1955 are used as an indication of the character of each season. Trends (1920–1950) were computed for 40 stations on a "percentage of normal" basis and isolines of trend drawn on a chart. These show a drying trend in the N.W., N and N.N.E., and a trend toward moister conditions in the E. and S.E. DAVID LIVINGSTON gives rainfall data for 1866–1867, and 1867–1868. Other records are to be found in journals and diaries, but all indicate the absence of any "normal season" with respect to rainfall, in this land. *Subject Headings:* **1. Rainfall variability 2. Rainfall trends 3. Northern Rhodesia.**—*M.R.*

9.6–215 551.577.3(72)

Wallén, C. C. (*Swedish Met. and Hydro. Inst., Stockholm*), **Fluctuations and variability in Mexican rainfall.** (In: White, Gilbert F. (*ed.*), **The future of arid lands.** Wash., D. C. American Association for the Advancement of Science, **1956.** p. 141–155. 7 figs., table, 6 refs.) **DLC**—After briefly discussing the most important meteorological research problems to be studied in desert areas, the author analyzes the fluctuation and variability of Mexican rainfall. The areal characteristics of precipitation and the circulation factors associated with Mexican precipitation, long term fluctuations in maximum rainfall, the variability of the rainfall, the frequency distribution of rainfall amounts, and the relationship between rainfall variability and agriculture are discussed. Isohyetal charts showing mean annual precipitation (1919–1953), the relative interannual variability of precipitation, isoanomals of relative variability of annual precipitation anomalies with normal world distribution of relative variability of precipitation, etc., are presented. *Subject Headings:* **1. Rainfall variability 2. Precipitation anomalies 3. Rainfall frequency distribution 4. Mexico.**—*I.L.D.*

9.6–216 551.577.33:551.590.25

Davis, Saville R. (*American News editor, Christian Science Monitor*), **A seasonal cycle of rainfall.** *Cycles*, N. Y., 6(9):281–285, Nov. **1955.** 7 figs. **DWB**—BOWEN's theory of rainfall cycles corresponding with cycles of meteoric dust fallout is reviewed at great length in a friendly manner for popular consumption. The writer speculates on the possibility that the added rainfall on the critical dates could affect the circulation patterns (rather than vice-versa) through release of latent heat. *Subject Headings:* **1. Precipitation anomalies 2. Rainfall cycles 3. Bowen's meteoric dust theory.**—*M.R.*

9.6–217 551.577.34

*Kincer, Joseph Burton (*Div. of Climate and Crop Weather, U. S. W. B., Wash., D. C.*), **Precipitation: its trends and tendencies. Address delivered at the 45th Annual Meeting of the Pennsylvania Water Works Association, Oct. 17, 1940.** 35 p. 19 figs. **DWB** (M77 U587p)—Statistics on temperature, precipitation and snowfall for Pennsylvania and other parts of the U. S. are presented to show the tendency towards persistence from year to year of wet or dry years, hot or cold years, etc. Variations from one part of the country to the other, with respect to any "trends," makes long-range forecasts on the basis of general trends or cycles risky—rather, they must be made for specific areas. At the time (1940), the northern U. S. was generally in a warming and drying "cycle" as shown by numerous cumulative graphs. *Subject Headings:* **1. Precipitation trends 2. Long range precipitation forecasting.**—*M.R.*

9.6–218 551.577.37(521.52)

Miyazawa, S., **On the occurrence time of intense rain and snowfall in Nagano District.** *Journal of Meteorological Research*, Tokyo, 9(8):570–574, Aug. **1957.** 5 figs., 5 tables, 6 refs. **DWB**—The occurrence times of intense rain and snowfall in Nagano and area drained by the River Tenryu were investigated, using 275 data of maximum 1-hour rain and snowfall amount in these districts. Some interesting results obtained are summarized as follows: 1) The intense rainfall of more than 30 mm/hr is caused usually by a convective thunderstorm, or by a cold front (always accompanied by thunder or lightning). The intense snowfall of more than 1.1 mm per hour is caused by monsoon in winter (Tables 1, 2 and 3). 2) The fact that intense snowfall is apt to occur at night or early morning was ascertained by the statistical method. The diurnal frequency variation of occurrence time of intense rain and snowfall was decomposed into elementary oscillations by harmonic analysis. Consequently, 1-day and ½-day periods were found to predominate. 1-day period variation of intense rainfall seems to be caused by insolation. Maximums in the early morning of 1-day or ½-day period variation of intense rainfall are considered to be caused by radiative cooling on the top of cloud layer and increase of vertical wind shear. 3) The occurrence times of intense rainfall over the upper Tenryu River basin were investigated. It is found that the intense rainfall is apt to occur in the early morning and afternoon at the coastal and inland districts, in the afternoon remarkably at mountain districts. *Subject Headings:* **1. Rainfall intensity occurrence 2. Snowfall intensity occurrence 3. Nagano District, Japan.**—*Author's abstract.*

9.6–219 551.577.37

Thom, H. C. S. (*Office of Climatology, U. S. W. B.*), **Time interval distribution for excessive rainfall.** Presented at the A.G.U. meetings, Wash., D. C., April 29, 1957. "Draft copy for review." April **1957.** 9 p. fig., 7 tables, 2 refs., eqs. **DWB**—In present practice, the frequency of occurrence of excessive rainfall is expressed as *mean* recurrence interval which is a function of rainfall amount for a fixed duration. Although the recurrence interval is of primary interest, present methods average the interval which conceals a great deal of information. If the probability is related to recurrence interval instead of rainfall amount, the distribution of the recurrence interval is obtained. This allows the determination of the risk of recurrence for any time interval. The distribution of the time is parametric and may be mathematically fitted to observational data. This is done for several examples to show its application to observational data. The relationship of the distribution theory to present methods is also given. *Subject Headings:* **1. Excessive rainfall frequencies 2. Rainfall recurrence interval.**—*Author's abstract.*

9.6–220 551.577.38(492)

Lenstra, G. A., **Droogteperioden.** [Dry spells.] (In: Nederlandse Centrale Organisatie voor Toegepast-Natuurwetenschappelijk Onderzoek. Commissie voor Hydrologisch Onderzoek, **Verslagen technische bijeenkomsten 7–10 en Verslag inzake het verdampingsonderzoek in de Rottegatspolder 1947–1952.** Pub. 'S-Gravenhage, **1955.** p. 33–39. 2 tables. English summary p. 260–261; French summary, p. 283.) **DWB**—Using the definitions of dry spells formulated in England (Type I—sixteen or more consecutive days with a maximum of 0.1 mm of rainfall per day; Type II—at least 20 consecutive days in which the mean rainfall

of 0.01 mm per day was not exceeded, and Type III—twenty-nine or more consecutive days in which the mean rainfall of 0.01 mm per day was not exceeded), the author investigated the number of dry spells in the Netherlands over the period 1867–1940. The regional and annual distribution of dry spells are examined and numerical data are presented in tables. The role of drizzle, evaporation and ground water level, and the use of weather maps to forecast dry spells, which in the Netherlands are attended by high pressure, are discussed. *Subject Headings:* **1. Dry spells 2. Netherlands.**—*I.L.D.*

9.6–221 551.577.38(435.1)

*Schindler, G., **Trockenheit auf dem Meere.** [Drought at sea.] *Der Seewart*, Hamburg, 18(3):105–112, June **1957.** fig., 7 tables, 3 refs. **DLC**—Results of a statistical study of dry days on the island of Helgoland (made for use in planning collection of rain water in reservoirs) are reported. Days without rain (rain of less than 1 mm was disregarded if it occurred during a rainless period of 10 days or more) were established for the 36 years 1899–1913, 1924–1944. The following data are presented: annual march of average dry-day frequency (curve); days with highest and lowest probability of rain, longest dry periods, and frequency of dry periods of 10 days or more, for each month of the year; monthly frequencies of dry periods of specified duration and finally number of successive years in which dry periods of 10 days' duration (a) did or (b) did not occur during specified months (tabulated for each month). Results of the analysis are discussed and several "singularities" are identified. *Subject Headings:* **1. Dry periods 2. Drought 3. Long period records 4. Helgoland.**—*G.T.*

9.6–222 551.577.51

Bugaev, V. A. and Petrosiants, M. A., **Orografiia i osadki Talasskoĭ doliny.** [Orography and precipitation in the Talass Valley.] *Meteorologiia i Gidrologiia* No. 7:19–22, July **1956.** fig., 3 refs. **DWB, DLC**—A brief discussion is given of the relationship between orography, slope expanse and air flow on the one hand, and precipitation on the other, in Central-Asia and an explanation is attempted of the reasons for the rainfall deficiency in the Talass Valley. The orography of this area, the relation to the circulation and to incoming winds is described and the seasonal synoptic conditions and precipitation are analyzed. A map showing the regions with the maximum rainfall amounts in the mountainous regions of Central Asia is presented. *Subject Headings:* **1. Orographic rainfall 2. Talass Valley, U.S.S.R.**—*I.L.D.*

RAIN, SNOW AND HAIL

See also: **Impingement of drops** (Hacker), 9.6–75; **Radar rainfall intensity studies** (Austin), 9.6-94; **Radar hail detection, Midwest U. S.** (Cook), 9.6–95; **Radar analysis of snowfall** (Imai), 9.6–97; **Radar snowfall observations** (Kodaira, Inaba), 9.6–98; **Raindrop velocity meas. and raindrop photog.** (Magarvey), 9.6–119.

9.6–223 551.578.11:551.508.77

Blanchard, D. C. (*Woods Hole Oceanographic Inst., Mass.*), **Discussion of raindrop distributions made during project shower, Hawaii, 1954.** (In: Conference on the Physics of Cloud and Precipitation Particles, Sept. 1955, **Proceedings.** Pub. N. Y., Pergamon Press, **1957.** p. 213–223. 7 figs., table, 5 refs.) **DLC** (QC921.5.U5), **DWB**—Concurrent with other Project Shower measurements in Hawaii, raindrop size distribution samples were obtained within the clouds with a portable mechanical device. At two-minute intervals these devices, called drop recorders, automatically collected a sample of rain on a section of a water-soluble dye-impregnated paper. The time rate of change of the drop size distribution was obtained from the exposed paper tapes. At the end of a shower, the time rate of decrease of drop size has been found to be from 0.07—0.01 mm min^{-1}. It is felt that this fact is in some way a reflection of the basic mechanism of the rain formation, but as yet no explanation has been forthcoming. *Subject Headings:* **1. Raindrop size distribution 2. Raindrop recorders 3. Hawaii.**—*Author's abstract.*

9.6–224 551.578.11:531.66

Lewis, William and Brun, Rinaldo J. (*both, Lewis Flight Propulsion Lab., Cleveland, Ohio*), **Impingement of water droplets on a rectangular half body in a two-dimensional incompressible**

flow field. *U. S. National Advisory Committee for Aeronautics, Technical Note,* 3658, Feb. **1956.** 27 p. 6 figs., 3 tables, 13 refs., 22 eqs. **DWB, DLC**—Trajectories of water droplets moving in the ideal two-dimensional flow field ahead of a body of rectangular cross section and infinite extent in the downstream direction have been calculated by means of a differential analyzer. Data on collection efficiency and distribution of water impingement are presented. *Subject Heading:* **1. Impingement of drops.**—*NACA abstract.*

9.6–225 551.578.11:77

Jones, Douglas M. A. and Dean, Lawrence A. (*both, Ill. State Water Survey Div., Urbana*), **Some observations from photographs of falling raindrops.** (In: Conference on Radio Meteorology, Univ. of Texas, Austin, Nov. 9–12, 1953, **Proceedings,** [v. 1]:VIII-2, pub. **1953.** 4 p. 6 figs.) **DLC** (QC611.067), **DWB**—Enlargements to $\frac{3}{4}$ natural size, made from 35 mm negatives of raindrops falling on Aug. 7, 1953 from 1749 to 1750 CST during a thunderstorm (with small hail) are presented. Rainfall rate was 48 mm/hr. Largest drop was 10.4 mm×7.6 mm. A non-symmetrical vibrating drop 8.2×3.5 mm, a shattered raindrop, one in process of breaking, 3 normal drops, and 3 at 3 different angles are shown. In the case of the largest drop, the reflectivity would be 1.9×10^5, or 1.3×10^6 times that of a 1 mm drop, depending on whether the vertical axis, the equivalent spherical shape, or the horizontal axis is used as the important parameter. *Subject Headings:* **1. Raindrop photographs 2. Raindrop reflectivity 3. Raindrop sizes.**—*M.R.*

9.6—226 551.578.41:551.501.8:551.574.11

Douglas, R. H. (*Stormy Weather Group, Met. Service of Canada, Toronto, Ont.*), **Snow growth and aggregation in generating cells.** (In: Conference on the Physics of Cloud and Precipitation Particles, Sept. 1955, **Proceedings.** Pub. N. Y., Pergamon Press, **1957.** p. 277–287. 9 figs., 10 refs.) **DLC** (QC921.5.U5), **DWB**—In moist stable air, in which ice crystals grow, significant vertical development may occur as the result of the supply of latent heat of sublimation. The vertical development is comparable to the observed depth of snow generating cells as observed by radar; calculated updraft velocities are comparable to the terminal velocities of snow crystals or of aggregates. In air containing supercooled water cloud, the sublimational updraft is very much lower than in cloud-free air; thus, shear and turbulence could develop across a cloud boundary in the presence of growing ice crystals and be a significant factor in the aggregation of crystals. It is suggested that cloud boundaries, along which aggregation is favored, serve as the bases for the snow-generating cells which are so frequently observed by radar. *Subject Headings:* **1. Ice crystal growth 2. Snow generating cells 3. Radar snow observations.**—*Author's abstract.*

9.6–227 551.578.41:551.501.7

Weickmann, Helmut, **The snow crystal as aerological sonde.** (In: Conference on the Physics of Cloud and Precipitation Particles, Sept. 1955, **Proceedings.** Pub. N. Y., Pergamon Press, **1957.** p. 315–326. 9 figs., 12 refs.) **DLC** (QC921.5.U5), **DWB**—Since snow crystals carry their life histories with them and since our knowledge about their formation has considerably increased during the past years, they can be used as aerological sondes. Continuous snowfall sometimes is characterized by a systematic modification of the crystal forms. Observations are analyzed which have been made during the winters 1947–49. *Subject Heading:* **1. Snow crystal aerology.**—*Author's abstract.*

9.6–228 551.578.46:551.501

Ishiwara, Kenji et al., **Examples of snow survey in Japan,** *Researches on Snow and Ice,* Tokyo, No. 2:203–236, Jan. **1955.** In Japanese. **DWB**—84 cases of snow survey in Japan are grouped under 5 districts: Hokkaido, Tohoku, Hokuriku, Kanto and Chukoku and each survey case indicates survey area, period, purpose of survey, instruments used, brief summaries of survey contents, means of data process, results and date, and source of journal in which published. The dates of survey range from 1948 to 1954. *Subject Headings:* **1. Snow surveys 2. Japan.**—*J. Woo.*

9.6–229 548.5:551.578.46

Marshall, J. S. and Gunn, K. L. S. (*McGill Univ., Montreal, Canada*), **A first experiment on snow-crystal growth.** (In: Conference on the Physics of Cloud and Precipitation Particles, Sept. 1955, **Proceedings.** Pub. N. Y., Pergamon Press, **1957.** p. 340–346. 4 figs., table, 3 refs., eqs.) **DLC** (QC921.5.U5), **DWB**—In analysing the experiments of NAKAYA and HANAJIMA, MARSHALL and LANGLEBEN found the boundaries between the various crystal types to be loci of constant vapor density excess over flat ice equilibrium. In the present experiment, plate needle and column crystals have been grown on a strand of spider silk in a cold box at temperatures from −4 to −20°C. The vapor densities have been measured accurately by measuring the rate of change of diameter of a supercooled water droplet suspended in the working region, and it appears that MARSHALL and LANGLEBEN's estimates of vapor density excess at the boundaries between crystal types are too high by 0.044 gm^{-3}. There is some evidence for an effective equilibrium vapor density of an ice crystal some 0.066 gm^{-3} higher than that for flat ice. Electric fields were applied and modifications in the crystal growth in general accord with SCHAEFER observed, but there is no evidence of equivalence between effects of charge and vapor density. *Subject Heading:* **1. Ice crystal growth.** —*Authors' abstract.*

9.6–230 548.5:551.578.46

Turnbull, David (*G. E. Res. Lab., Schenectady, N. Y.*), **Remarks on the theory of heterogeneous nucleation of crystals.** (In: Conference on the Physics of Cloud and Precipitation Particles, Sept. 1955, **Proceedings.** Pub. N. Y., Pergamon Press, **1957.** p. 354–359. 2 figs., table, 12 refs.) **DLC** (QC921.5.U5), **DWB**—The status of the theory connecting crystal nucleating effectiveness with the crystallographic relationship between the nucleating agent and the nucleus is reviewed. In addition to certain crystallographic requirements, an effective catalyst for the nucleation of crystals from dilute fluid solutions usually must have steps in its surface resulting from the termination of screw dislocations therein. Recent experiments have shown that, at least in some instances, such surface steps are also necessary for crystal growth in undercooled pure liquids. *Subject Headings:* **1. Ice crystal nuclei 2. Ice crystal growth.**—*Author's abstract.*

9.6–231 548.5:551.578.46

Wolff, G. A. (*Chem. Phys. Branch, Sig. Corps Engr. Lab., Ft. Monmouth, N. J.*), **The growth of ice crystals.** (In: Conference on the Physics of Cloud and Precipitation Particles, Sept. 1955, **Proceedings.** Pub. N. Y., Pergamon Press, **1957.** p. 332–339. 3 figs., 15 refs.) **DLC** (QC921.5.U5), **DWB**—The problem of the formation of ice crystals having different habits is discussed in detail. The growth of the ice from the vapor phase is analyzed for equilibrium conditions and in cases where equilibrium on the crystal surface has not been established. The equilibrium forms and the growth forms of ice result in the two cases mentioned. There is the possibility that the equilibrium form of ice crystals grown in an electric field changes radically, producing a pronounced needle-like habit. In certain cases when the crystals have macroscopic size, it is conceivable that the equilibrium form may not be obtained, even though the vapor phase is saturated. The role of diffusion in the growth process of snow dendrites from the highly supersaturated vapor phase is considered. A possible mechanism with respect to the formation of cubic ice is proposed. *Subject Heading:* **1. Ice crystal growth.** —*Author's abstract.*

9.6–232 551.578.9:551.575

Oberlander, G. T. (*San Francisco State College*), **Summer fog precipitation on the San Francisco Peninsula.** *Ecology*, Durham, North Carolina, 37(4):851–852, Oct. **1956.** fig., table, 3 refs. **DWB, DLC**—The author discusses the characteristics of the vegetation of the San Francisco Peninsula in relation to the coastal fog belt. Data are given on the precipitation obtained under fog exposed-trees during the summer. The position of a tree with respect to the fog-laden wind was found to be more important than the height, in determining the amount of condensation. *Subject Headings:* **1. Fog drip 2. San Francisco, Calif.**—*I.L.D.*

HYDROMETEOROLOGY

See also: **Water conditions, Calif.,** 9.6–11; **Evaporation data, Nyasaland,** 9.6–44; **Soil moisture-tree growth relationships, Ontario, Canada** (Fraser), 9.6–82; **Flood producing storms and cold pools, Mediterranean Basin** (Ward), 9.6–124; **Wind effects on river discharge** (Schmitz), 9.6–192.

9.6–233 551.579

Andreasen, Gordon E. and Rasmussen, William C., **A hydrologic budget in relation to the climate and geology of the Beaverdam Creek basin, Eastern Shore of Maryland.** *Washington Academy of Sciences, Journal,* 46(8):266–267, Aug. **1956. DLC, DGL**—Two years of observations resulted in the following annual figures in inches: Precipitation—41.6, runoff—15.0, evapotranspiration—25.2, gain in storage—1.4. Figures are given also for the ground water balance. *Subject Headings:* **1. Hydrologic cycle 2. Beaverdam Creek, Maryland.**—*A.A.*

9.6–234 551.579(666)

Bassler, Fritz (*Reg.-Baurat a.D., Freiburg*), **Unerschlossene Wasserkräfte in Liberia.** [The undeveloped waterpower in Liberia.] *Die Wasserwirtschaft,* Stuttgart, 46(6):141–150, March **1956.** 14 figs. (incl. photos), table, 4 refs. **DLC**—A survey of potential water power, based on very limited data and air reconnaissance. Climatological conditions are outlined and runoff is estimated on the basis of assumed evapotranspiration. *Subject Headings:* **1. Water power 2. Runoff 3. Liberia.**—*A.A.*

9.6–235 551.579:061.3

Bitsilli, V. M. and Grinval'd, D. I., **Konferentsiia po voprosam maksimal'nogo stoka.** [Conference on problems of maximum runoff.] *Meteorologiia i Gidrologiia,* No. 8:66–67, Aug. **1956. DWB, DLC**—The report of an international conference held in Odessa, May 9–12, 1956 dealing with the theory, computation and investigation of maximum runoff. The papers dealt largely with the formation and forecasting of floods. *Subject Headings:* **1. Maximum runoff 2. Conferences.**—*I.L.D.*

9.6–236 551.579

Chistiakov, G. E., **K ratsionalizatsii gidrometricheskikh rabot na bol'shikh rekakh.** [Increasing the efficiency of hydrometric operations on large rivers.] *Meteorologiia i Gidrologiia,* No. 8:46–47, Aug. **1956.** 2 figs. **DWB, DLC**—In the carrying out of hydrometric observations on large rivers, power boats are used to tow auxiliary, non-power vessels from which the hydrometric observations are made. With the aid of diagrams, the author describes a method of towing which prevents any interference in hydrometric measurement (when the towing boat is at anchor). *Subject Headings:* **1. Hydrometric observations 2. River hydrology.**—*I.L.D.*

9.6–237 551.579

Maksimov, I. A., **O metodike rascheta stoka pustynnykh raĭonov.** [Method for calculation of runoff in desert regions.] *Meteorologiia i Gidrologiia,* Leningrad, No. 5:46, Sept./Oct. **1955.** fig., refs. **DWB, DLC**—The author shows that, for calculating the flow normals for desert regions of Turkmenistan, it is possible to use the relationship between flow and precipitation only when the intensity of precipitation and the preceding humidification of the region are taken into account. *Subject Headings:* **1. Runoff calculation 2. Desert regions 3. Turkmenistan, U.S.S.R.**—*I.L.D.*

9.6–238 551.579(05)

Muranov, A. P., **Gidrologicheskie ezhegodniki basseĭna reki Kongo.** [Hydrological yearbooks for the Congo Basin.] *Meteorologiia i Gidrologiia,* No. 9:55–58, Sept. **1956.** 2 figs., table, 4 refs. **DWB, DLC**—A detailed summary of the contents of the 1950 and 1951 yearbooks of the Congo Basin and of Ruanda-Urundi. An authentic map of hydrological stations in the Congo Basin and graphs having annual variation of water levels of individual typical rises are reproduced. *Subject Headings:* **1. Hydrology yearbooks 2. Congo Basin.**—*I.L.D.*

9.6–239 551.579:551.577:551.573

Schmuck, Adam, **O krazeniu wody w przyrodzie.** [Hydrological cycle in nature.] *Czasopismo Geograficzne*, Warsaw, 27(1):13–23, **1956.** 2 figs., 4 tables, 11 refs. Polish and French summaries p. 23. **DLC**—A discussion of the importance of evaporation in the hydrologic cycle is presented. The intensity of evaporation and the amount of precipitation show the surplus or deficiency of water in a given area. These two elements are not only the principle factors of water reserves but are, at the same time, particularly important values from the climatologist's point of view. The difference P−E (precipitation minus evaporation) is, therefore, a factor of great geophysical import. It is much more difficult to obtain data on evaporation than on precipitation, on the continents as well as on the seas. In concluding his paper, the author asserts that, in spite of many difficulties, science will achieve in the near future the proposed goal, and relying on more accurate studies of these factors (P−E), will be able to compare definitely the distribution and the quantity of precipitated and evaporated water. *Subject Headings:* **1. Hydrologic cycle 2. Precipitation−evaporation (P−E).**—*A.M.P.*

9.6–240 551.579:06

Zigun, V. P., **Mezhdunarodnoe soveshchanie po voprosam gidrometeorologii.** [International meeting on problems of hydrometeorology.] *Meteorologiia i Gidrologiia*, Leningrad, No. 6:66–67, Nov./Dec. **1955. DWB, DLC**—This international meeting, which was held in Moscow during Sept. 1955, was attended by the European countries behind the "iron curtain." Its main interest was the improvement in the exchange of hydrometeorological and aerological observations. Measures were adopted to exchange 24-hr observations, to unify the observation periods, increase aerological observations, to exchange hydrometeorological and aerological observations by telegraph, to improve the hydrometeorological flotilla on the Black Sea and Baltic Sea, to adopt code FM-15 for exchanging aviation and aerological data and codes FM-51 and FM-52 for synoptic data among airports, etc. *Subject Headings:* **1. Hydrometeorological service improvement 2. Upper air observations 3. U.S.S.R.**—*I.L.D.*

CLIMATOLOGY AND BIOCLIMATOLOGY

CLIMATOLOGY

See also: **Climatology conference, U.S.S.R.,** 9.6–11; **Progress in climatology** (Khrgian), 9.6–52; **Desert climatology, S.W. United States** (Clements), 9.6–255); **Desert ecology, N.W. Rajasthan, India** (Sarup), 9.6–256; **Desert and plant ecology, U. S. and Israel** (Went), 9.6–257.

9.6–241 551.58:551.511

†Shvets, M. E., **Sovremennoe sostoianie issledovaniĭ po teorii klimata.** [Present state of investigations on the theory of climate.] (In: Budyko, M. I. (*ed.*), **A. I. Voeĭkov i sovremennye problemy klimatologii.** Leningrad, **1956.** p. 205–225. 9 figs., 51 refs.) **DWB**—After a brief discussion of the nature of physical mathematical descriptions of climate and climatic theory during the 19th century, the author considers in detail the relation to climatic theory of the heat regime of the atmosphere, the geographical laws of the fundamental processes of the transformation of solar radiation at the surface of the earth, the relation between solar radiation and atmospheric temperature, the theory of the general circulation and the significance of the oceanic circulation in a general theory of climate. *Subject Headings:* **1. Climate 2. Heat balance 3. General circulation 4. Oceanic circulation.**—*I.L.D.*

CLIMATE OF PARTICULAR PLACES

See also: **Climatic landscapes, Japan** (Yazawa), 9.6-7; **Historical climates, France** (Sanson), 9.6–246.

9.6–242 551.582(68):551.583:551.577.38

Walter, Heinrich, **Grundlagen der Weidewirtschaft in Südwestafrika.** [Fundamentals of grasslands culture in Southwest Africa.] Stuttgart, Eugen Ulmer, **1954.** 281 p. figs.,

tables. Article by Walter, p. 1–182. Appended article by Volk on **Grass taxonomy,** p. 183–281. **DLC** (QK938.M4W3)—Ch. I (p. 12–34) takes up in detail the climatic conditions of Southwest Africa (17°–29°S), including the regional variations in rainfall, the question of the drying up of S.W. Africa, the seasonal and secular distribution of precipitation, and the possibility of artificial control or change of the climate. Carefully drawn isohyetal chart, schematic diagrams and selected tabular data and histograms are presented, to testify to the analytical nature of the treatment. Soil erosion, fertilization and plant conditions in the Prairies of S.W. Africa occupy the remainder of the book. It is concluded that although over the thousands of years since the Ice Age the region has been drying up, a tendency toward drought in the earlier decades of this century has been reversed in the last 15 yrs. *Subject Headings:* **1. Climate of Southwest Africa 2. Climatic changes 3. Drought 4. Southwest Africa I. Volk, Otto Heinrich.**—*M.R.*

9.6–243 551.582.1(711)

Weir, Thomas, **Ranching in the southern interior plateau of British Columbia.** *Canada Dept. of Mines and Technical Surveys. Geographical Branch, Memoir,* No. 4, **1955.** 124 pp., 31 figs., photos, 13 tables, 41 refs. Price: $1.75.—Study includes on p. 12–19 a discussion of the climate of the southern interior plateau of British Columbia. The Selkirks and Rockies provide a barrier to cold continental air from the prairies but none to the Arctic air masses. Local effects in the numerous valleys and plateaus, air masses, climatic types, temperature, humidity, precipitation, snow (map of average annual snowfall) and severity of winter conditions, as shown on a chart indicating for 19 stations the relation between depth of snow and length of frost-free season and segregating 6 "types" important for ranching, are discussed. Types range from long winters with heavy snow (in the Chilcotin Uplands) to short winters with light snow (Kamloops region). *Subject Headings:* **1. Ranching climate 2. Climate of British Columbia Plateau 3. British Columbia Plateau.**—*M.R.*

9.6–244 551.582.2:355(48)

*Landsberg, H. et al., **Strategic aspects of the climate of Norway and adjacent Scandinavian regions.** *Chicago Univ. Institute of Meteorology, Military Climatology Project, Report* No. 25, April 20, **1943.** 2 parts. Pt. 1, **Text,** 75 p. Pt. 2, **Atlas** (unpaged), 30 charts. **DWB** (M055 0532m)—The general features of the climate and weather of Norway, Sweden and Finland are discussed in connection with land, sea and air operations during the different seasons. The atlas contains nice isohyetal charts on monthly precipitation, histograms and other presentations of annual regime of cloud, fog, rain, thunderstorms, rainy days, temperature, sea temperature, gales, wind, upper air wind and temperature; sunshine ceiling, visibility, etc. (mostly pasted on maps at approximate location of stations). Each chart, and the general features thereof, is discussed in the text. Notes on actual weather experience in the campaign of April–May 1940 on the Coast of Norway are found on p. 30–40. *Subject Headings:* **1. Climate of Scandinavia 2. Military climatology 3. Norway 4. Sweden 5. Finland**—*M.R.*

CLIMATIC VARIATIONS

See also: **Climatic cycles and auroras, Japan** (Nishioka), 9.6–16; **Pleistocene period, Banks Is., Canada** (Terasmae), 9.6–25; **Historical climates, Greece** (Kyriazopoulos), 9.6–53; **Wind erosion and periglacial soil formations, Tatra Mts.** (Plesník), 9.6–190; **Climatic changes and drought, S.W. Africa** (Walter), 9.6–242.

9.6–245 551.583:551.324.63

Ten Kate, H., **Verandert ons klimaat?** [Is our climate changing?] *Hemel en Dampkring,* The Hague, 54(10):182–186, Oct. **1956. DWB, DLC**—In this popular discussion of the problem of climatic change, the author discusses the relationship between climate and weather, the determination of the facts of climatic changes, annual climatic cycles, the evidence of climatic change from the recession and advance of glaciers, mean temperature and the causes and consequences of climatic change. *Subject Headings:* **1. Climatic variations 2. Glacial action.**—*I.L.D.*

9.6–246 551.583.2:551.582.1(44)

Sanson, J., **Le climat de Paris au début de l'époque Romantique était à peu près identique a celui du milieu du XX^e siècle.** [Paris climate at the beginning of the Romantic Period was nearly identical to that of the mid-20th century.] *La Météorologie*, Paris, Ser. 4, No. 43:292–299, July/Sept. **1956.** tables. **DWB**—Along with a literary style account of weather conditions and fashions in the Romantic period (1820–29) which began with the Revolution (1789), there is a series of comparisons of temperature, precipitation, days with frost, etc., in the 1820–29 decade with that of the 1940–49 decade, showing that there were very slight differences in any month of the year between the 2 decades over a century apart—at least in France. The winter of 1829–30, however, was the most severe of the century (except for 1879–80). Finally, the 35 yrs from 1919–1953 are the same (May–Aug.) as those from 1884–1918, with respect to the number of dry months, and to the number of months with about 250 hrs. of sunshine, but were significantly warmer, so that a man of 70 could truthfully say it was warmer nowadays than when he was young. *Subject Headings:* **1. Historical climates 2. Climate of France 3. France.**—*M.R.*

9.6–247 551.583.3:551.524.35

†Morawetz, Sieghard, **Zur Frage der eiszeitlichen Temperaturerniedrigung.** [Problem of the lowering of temperature during the glacial period.] *Geographische Gesellschaft, Vienna, Mitteilungen*, 97(3):192–201, **1955.** 30 refs. **DLC**—The values accepted for the lowering of temperature over Europe during the glacial periods are now about double the values proposed by A. Penck in 1891, i.e., 8–10°C instead of 5°C. The temperatures around the snowline in the Alps are only slightly lowered but for continental glaciation a much greater amount of cooling must be presupposed (than for mountain glaciers or firn). Considerable literary evidence is cited. *Subject Headings:* **1. Glacial period temperature lowering 2. Europe.** —*M.R.*

9.6–248 551.583.3

Sauer, Carl O. (*Dept. of Geog., Univ. of Calif., Berkeley*), **The end of the Ice Age and its witnesses.** *Geographical Review*, N. Y., 57(1):29–43, Jan. **1957.** 29 refs. **DWB, DLC**—The author summarizes recent knowledge on the physical geography of the U. S. at the end of the Ice Age during the Mankato advance about 11,000 yrs ago, the correlations of the Mankato advance with the European ice advance, the ocean core evidence of climatic change about 11,000 yrs ago, climate during the Mankato glaciation and Ewing and Donn's theory of the origin of the Ice Ages, which proposes a migration of the North Pole in the North Pacific with the Arctic Ocean. *Subject Headings:* **1. Ice Ages 2. Climatic changes 3. United States.** —*I.L.D.*

MICROCLIMATOLOGY

See also: **Ind. indoor air** (Shagan), 9.6–139.

9.6–249 551.584.61:697.9

Akai, S. (*Tottori Weather Station, Japan*), **A meteorological new method for analysis on the capacity of cold-protection of house.** *Meteorological Society of Japan, Tokyo, Journal, Ser. 2*, 33(5):188–193, Nov. **1955.** 3 figs., 6 tables, 10 refs., 25 eqs. In Japanese; English summary p. 188. **DWB, DLC**—Under considerations of natural ventilation caused by the temperature difference between room air and open air, and total heat transmission through the room-walls, the author obtained theoretically the following equation:

$$\frac{d\theta}{dt} = -\beta'(\theta - T')^{\frac{1}{2}} - \eta'(\theta - T),$$

where θ and T denote temperature of room air and open air respectively, t time and β', η' constants. In this paper, the author determined analytically in several cases the value of η' and β' which indicate the capacity of cold-protection of house, comparing the solution of the

above equation

$$\theta = T + \left[\frac{\eta' \exp\left(-\frac{\eta'}{2} t\right)}{\beta' + \frac{\eta'}{V\theta_0 - T} - \beta \exp\left(-\frac{\eta'}{2} t\right)} \right] \text{ when } (\theta)_{t=0} = \theta_0,$$

with observational data of θ and T. The coincidence between the results obtained analytically and those obtained from the observation was considerably good. *Subject Heading:* **1. Heat flow through walls.**—*Author's abstract.*

9.6–250 551.584.7:63

von Poletika, W. P., **Climatic survey of Russian agriculture.** *Institute for the Study of the History and Culture of the USSR, Munich, Bulletin,* 2(8):3–12, Aug. **1955.** 2 figs., tables.—The author disagrees with the prevailing opinion on the inexhaustability of the Soviet Union agricultural resources based on the idea of the legendary fertility of the "chernozem" (black earth), and the vastness of its agricultural area. Both these conceptions are wrong, as the agricultural area and the agricultural potential are both determined by soil conditions (lack of water) and the climate. In fact, of a total area of 22 million sq. km, only 1.5 million (or barely 7 percent) are under plow. In order to justify his assertions, the author examines the area of crop cultivation from a climatic point of view, discusses the natural location of agriculture limited by climatic boundaries of cultivation and the possibilities of widening them by measures of changing the aridity of arable soils by afforestation and irrigation. *Subject Headings:* **1. Soil climatology 2. Agricultural climatology 3. U.S.S.R.**—*A.M.P.*

CLIMATIC CLASSIFICATION

See also: **Climatic landscapes, Japan** (Yazawa), 9.6–7; **Arid zone research** (White), 9.6–41.

9.6–251 551.585.5

Bharucha, F. R., (*Inst. of Science, Bombay*), **The structural and physiological features of the Rajasthan Desert.** *UNESCO, Arid Zone Research,* No. 5, (Plant Ecology: Proceedings of the Montpellier Symposium), p. 34–38, **1955.** French summary p. 37. **DWB**—Discusses climatic classification for Northern India, adopting 10 inch annual rainfall and mean diurnal temperature range of 24°F or more as the limit for deserts, and 30 inch and a temperature range of 10°F for the limit of semiarid parts. Characteristic plant features are outlined. Meteorological data do not reveal a climatic change for the last 70 yrs. The advance of the desert is due to shifting of sand dunes. *Subject Headings:* **1. Arid zones 2. Climatic classifications 3. Rajasthan Desert, India.**—*A.A.*

9.6–252 551.585.5

Meigs, Peveril, **Arid and semiarid climatic types of the world.** *International Geographical Congress, 17th, Wash., D. C., Aug. 1952, Proceedings,* pub. **1956?** p. 135–138. 2 tables, 8 refs. **DWB** (912.6 I61p), **DLC** (G56.I58)—The author describes the basis used to construct maps delimiting and subdividing the dry climates. The precipitation divisions are based upon THORNTHWAITE's classification system. In turn, the areas thus obtained are subdivided according to the tempercline (mean temperatures of the coldest and warmest months). *Subject Headings:* **1. Arid climates 2. Climatic classifications 3. Homoclimatic maps.**—*I.L.D.*

9.6–253 551.585.5(569.4)

Meigs, Peveril (*Arid Zone Committee, Int. Geog. Union, Washington*), **Design and use of homoclimatic maps: dry climates of Israel as example.** (In: International Symposium on Desert Research, Jerusalem, May 7–14, 1952, **Proceedings,** pub. **1953.** p. 99–111. 2 figs. 23 refs. Discussion p. 109–111.) **DWB**—After reviewing briefly the principles of most important climate classifications, the author illustrates the application of homoclimate mapping to Israel. The climate of Israel and vicinity is classified according to major divisions based upon degree of aridity (using the THORNTHWAITE moisture index) and minor divisions based upon temperature. On the basis of these criteria, the climates of Israel are divided into

emiarid, arid, and other types of climate, depending upon vegetation. These various types of climate, and climates in other parts of the world resembling those of Israel, are described. A table with climatic data of Israel and vicinity, and maps showing the climates of Israel and immediately adjoining areas and homoclimates in the northern and central Negev are presented. *Subject Headings:* **1. Arid climates 2. Homoclimatic maps 3. Climatic classification 4. Climate of Israel 5. Israel.**—*I.L.D.*

9.6–254 551.586:551.585.53

Akademiia Nauk SSSR, Botanicheskii Institut, **Pustyni SSSR i ikh osvoenie, tom 2.** [Deserts of the U.S.S.R. and their reclamation, Vol. 2.] Moscow, Izdat. Akademii Nauk SSSR, **1954.** 801 p. figs., tables, numerous bibliogs., map (fold.). **DLC** (S613.A4, vol. 2). Review by M. P. Petrov in *Vsesoiuznoe Geograficheskoe Obshchestvo, Izvestiia*, 88(1):95–98, Jan./Feb. **1956. DLC**—The second volume of this comprehensive treatise on the deserts of the U.S.S.R. contains chapters by various authors on the utilization of plants indigenous to deserts, the biochemistry of desert plants under irrigated condition, methods of utilizing desert soils for cultivation, plant ecology of subtropical Turkmenistan, desert soils in the Soviet deserts, utilization of wind energy, soil moisture regime, etc. Several of the chapters of meteorological interest have been abstracted separately. *Subject Headings:* **1. Desert ecology 2. Desert bioclimatology 3. U.S.S.R. I. Pavlovskii, Evgenii N.** (*ed.*).—*I.L.D.*

9.6–255 551.585.53(78):551.581(78)

Clements, Thomas (*Univ. of Southern Calif.*), **A study of desert surface conditions.** *U. S. Quartermaster Research and Development Center. Environmental Protection Research Div., Technical Report* EP-53, April **1957.** 111 p. 44 figs. (incl. photos), 2 maps, 4 tables, 47 refs. **DWB** (M86 U585t)—This monograph deals mainly with soils, trafficability, vegetation, color, ruggedness and other surface conditions of the deserts in the Southwest U. S. Effects of wind, moisture, drainage and other weather factors are considered in a general manner. *Subject Headings:* **1. Desert climatology 2. Desert soil moisture 3. Southwest United States.**—*M.R.*

9.6–256 551.585.53:581.5

Sarup, Shanti (*Dept. of Botany, Jaswant College, Jodhpur, India*), **Plant ecology of the Northwestern Rajasthan.** (In: International Symposium on Desert Research, Jerusalem, May 7–14, 1952, **Proceedings,** pub. **1953.** p. 335–345. 7 figs., 2 tables, 9 refs.) **DWB**—The description of the topographic features of the Indian Desert and the climatic, soil and biotic factors determining the vegetation are discussed. The analysis of climate contains tables giving mean monthly and annual temperature, rainfall and relative humidity for various stations and a discussion of wind characteristics. *Subject Headings:* **1. Desert climatology 2. Desert ecology 3. Northwestern Rajasthan.**—*I.L.D.*

9.6–257 551.585.53:581.5

Went, F. W. (*Calif. Inst. of Tech.*), **Effects of rain and temperature on plant distribution in the desert.** (In: International Symposium on Desert Research, Jerusalem, May 7–14, 1952, **Proceedings,** pub. **1953.** p. 230–240. 8 refs. Discussion p. 237–240.) **DWB**—The life cycles of annuals and shrubs growing in the Mojave and Colorado deserts are described with reference to the role of rain and temperature in their germination. The role of photoperiodism is considered. Various field and laboratory experiments carried out in California and Israel are summarized. *Subject Headings:* **1. Desert ecology 2. Plant ecology 3. California 4. Colorado 5. Israel.**—*I.L.D.*

9.6–258 551.585.7(94)

*Western Australia. Univ. Geographical Laboratory, **Monthly climatic data for Australian mountain localities.** Its *Research Report* 41, [**1956.**] unpaged. entirely tables. Mimeo.—Monthly, mean, maximum and minimum temperature and total rainfall data for 1941–54 for 8 stations at high and low altitudes in the mountains of New South Wales and Victoria are tabulated. These are: 1) Glen Innes (3520 ft), Notham Heights (5954 ft), Kempsey West (31 ft), Kiandra (4578 ft), Kosciusko (5018 ft), Moruya Heads (55 ft), Omeo (2133 ft), and Orbost (100 ft). *Subject Headings:* **1. Mountain climates 2. Climatic data 3. Australian mountains.**—*M.R.*

BIOCLIMATOLOGY

See also: **Human and animal ecology** (UNESCO), 9.6–2; **Agroclimatology, Japan** (Nakada), 9.6–78; **Microclimatic data, East Bosnia, Austria** (Pasic), 9.6–85; **Desert ecology, U.S.S.R.** (Akademiia Nauk, S.S.S.R.), 9.6–254.

9.6–259 551.586:551.515.8:576

Kiss, István, **"Időérzékenységi" jelenségek ellenőrző vizsgálata a növényi mikroszer vezetek életében.** [Examination of weather sensitivity phenomena in plant microorganisms *Időjárás*, Budapest, 61(1):15–21, Jan./Feb. **1957.** 3 figs., 13 refs. Russian summary p. 1 German translation, p. 75–80. **DLC**—In earlier papers the author reported a definite relatio ship between the mass production of aquatic plant microorganisms and prefrontal weathe situations. In this paper he examines two more cases of such mass production (Lake Balato Aug. 1934 and in a frozen pool in Jan. 1950) and finds confirmation for his earlier identificatio of a prefrontal effect. *Subject Headings:* **1. Microorganisms 2. Prefrontal effects 3. Weathe sensitivity.**—*G.T.*

9.6–260 551.586:581.

Went, Frits W., **The role of environment in plant growth.** (National Sigma Xi Lecture 1955/56.) *American Scientist*, New Haven, 44(4):378–399, **1956.** 11 figs., 6 refs. **DLC** "Most of the material on which this article is based will be pub. as **The Experimental contro of plant growth,** by Chronica Botanica Co., Mass."—The growth or development of geneticall uniform plants of various types (e.g., strawberries, tomatoes, African violets, daisies, etc. under rigorously controlled conditions (i.e., in a phytotron, or climate controlled greenhouse is discussed analytically and illustrated. Plants are all placed on wheeled tables so they ma be readily moved from one environment to another. Radiation, temperature, humidity contamination of the air by gases, spores, fungi, etc., rain and wind can be varied under 5 different simultaneous combinations of conditions. Facilities used since 1939 at the Clar Greenhouses and since 1949 at the Earhart Plant Research Laboratory at Caltech, and result (growth rates as functions of day or night temperature, light intensity in different spectra regions, etc.) are described and illustrated. Reduction in coefficient of variability of growt in relation to increase in control of environment is shown dramatically on a graph. *Subjec Headings:* **1. Plant climatology experiments 2. Climate control 3. Climatic controllee greenhouses 4. Phytotron.**—*M.R.*

9.6–261 551.586:595.

Planes Garcia, Silverio, **Memoria de las experiencias realizadas contra el *earias insulana platyedra gossypiella* y otras plagas del algodonero: campana de 1954.** [Memoir on experi ments conducted to control *insulana platyedra gossypiella* and other cotton pests; the 195 season.] *Spain. Instituto Nacional de Investigaciones Agronomicas, Anales*, 4(4), Dec. **1955** p. 667–668, **Observatorios termohigrometricos** [Thermohygrometric observatories]. **DLC**— Isolated data are presented on maximum and minimum atmospheric temperatures and relative humidity during Aug. and Sept. at Cerda, Santa Eufemia (Seville) and Córdoba. *Subjec Headings:* **1. Insect climatology 2. Temperature-humidity data 3. Spain.**—*I.L.D.*

SYNOPTIC CLIMATOLOGY

See also: **Snow ceilings, Labrador, Canada** (Muttit), 9.6–74.

9.6–262 551.589.1(94)

§ Moriarty, W. W. (*Section of Met. Physics, CSIRO, Aspendale, Australia,*) **Types and sequences of summer pressure distributions over Australia.** *Pacific Science Congress, 8th Quezon City, Philippines, Nov. 1953, Proceedings*, Vol. IIA, pub. **1956.** p. 1155–1165. 3 figs., table. **DWB**—In order to understand more fully the effects of continental heating, the author investigated the behavior of the Australian summer continental low. The distributions of mean sea level (M.S.L.) pressure were grouped into ten classes, day by day for the summer months, by using the 1100Z M.S.L. synoptic charts for Nov. to March; the class frequencies, month-by-month class frequencies and class sequences, and the relation

of the latter to trade wind strength are examined. Statistical data, class frequencies and synoptic charts illustrating the classes are presented. *Subject Headings:* **1. Pressure classification 2. Pressure distribution 3. Australia.**—*I.L.D.*

9.6–263 551.589.1

Schuepp, Max, **Begriffe und Definitionen in der Witterunsklimatologie.** [Concepts and definitions in synoptic climatology.] *Schweizerische Naturforschende Gesellschaft, Verhandlungen*, 135:115–116, **1955. DWB**—A statistical study of alpine weather situations has been carried out jointly since 1955 by the Kloten Aviation Weather Observatory and the Zurich Central Meteorological Office. Air flow in the lowest and in the higher layers are used as possible parameters. The classification is made on the basis of surface isobaric and 500 mb trends, with a subdivision in 11 classes: 8 main wind directions and 3 classes of light wind situations. Further characteristics of the weather situation are made in conformity with HESS-BREZOWSKY's classification of air masses which are given in detail. *Subject Headings:* **1. Alpine meteorology 2. Air mass climatology 3. Switzerland.**—*A.M.P.*

9.6–264 551.589.5:551.509.314:519.2

*Péczely, György, **Komplex klimatológiai jellemzés meteorológiai elemértékek kombinációinak segítségével.** [Complex climatological classification by means of combined values of meteorological elements.] *Időjárás*, Budapest, 61(1):22–28, Jan./Dec. **1957.** 4 tables. German summary p. 22. **DLC**—Monthly probabilities of 36 different combinations of temperature, cloudiness, wind speed and precipitation are determined for Budapest for the period 1891–1955. A comparison of these probability values with values of chance probability shows that 34 out of the 36 combinations are on a sufficient level of significance to be considered real weather types. Probabilities of 12 different combinations of cloudiness, wind speed and precipitation are also determined for Jan. and July. *Subject Headings:* **1. Weather types 2. Probabilities 3. Budapest, Hungary.**—*Trans. of author's abstract.*

MISCELLANEOUS

COSMIC INFLUENCES

See also: **Rainfall cycles** (Davis), 9.6–216; **Eclipse effects on sferics** (Ehmert, Revellio), 9.6–291.

9.6–265 551.590.24:551.510.535:551.510.62

Piggott, W. R. (*Radio Res. Station, Slough*), **Absorption measurements during an eclipse.** (In: **Solar eclipses and the ionosphere: a symposium** . . . ed. by W. J. G. Beynon and G. M. Brown. London, Pergamon, **1956.** p. 106–115. 6 figs., table, 12 refs., 7 eqs.) **DWB**—The measurement and interpretation of the changes in intensity of radio waves reflected from the ionosphere during an eclipse present many difficulties. Some methods of overcoming these are discussed and applied to observations made at Ibadan, Nigeria, during the eclipse of Feb. 25, 1952. It is found that the eclipse perturbation of the absorbing region implies a distribution of ionizing radiation over the sun's disk closely similar to those found for the E and F1 layers during the same eclipse. *Subject Headings:* **1. Eclipse effects on ionospheric reflection 2. Eclipse effects on radio waves 3. Solar eclipse, Feb. 1952 4. Ibadan, Nigeria.** —*Author's abstract.*

9.6–266 551.590.24:551.510.62:621.396.029

Rawer, Karl (*Service de Prévision Ionosphérique Militar, Frieburg*), **Absorption measurements for the eclipse of June 30, 1954.** (In: **Solar eclipses and the ionosphere: a symposium** . . . ed. by W. J. G. Beynon and G. M. Brown. London, Pergamon, **1956.** p. 102–105. 6 figs., 5 refs.) **DWB**—Results are presented of field strength and virtual height measurements made at Freiburg on frequencies of 2.9 and 1.95 Mc/s during the partial eclipse of June 30, 1954. The different behaviors observed on the two frequencies are explained in terms of the relative contributions of deviative and non-deviative absorptions. It is found possible to isolate these two types. Some observations on 1.95 Mc/s at oblique incidence are also described. *Subject*

Headings: **1. Eclipse effects on radio waves 2. Solar eclipse, June 1954 3. Freiburg, Austria.**—*Author's abstract.*

9.6–267 551.590.24:551.510.535

Stoffregen, W. (*Ionosphere Observatory, Upsala*), **Solar eclipse of June 30, 1954: preliminary report.** (In: **Solar eclipses and the ionosphere: a symposium . . .** ed. by W. J. G. Beynon and G. M. Brown. London, Pergamon, **1956.** p. 57–64. 11 figs., 2 tables.) **DWB**—Ionospheric measurements at two stations in Sweden during the eclipse of June 30, 1954 are summarized. The behavior of the *Es* layer was similar to that of the *E* and *F* layers during the eclipse, but some hours before the eclipse the *Es* ionization was high. Field-strength measurements for long and medium waves indicated a short, sharp increase near the eclipse maximum. The noise-level of atmospherics was also greater during eclipse. *Subject Headings:* **1. Eclipse effects on ionospheric layers 2. Sporadic E layer (Es) ionization 3. Solar eclipse, June 1954 4. Sweden.**—*Author's abstract.*

9.6–268 551.590.24:551.510.535

Szendrei, M. E. and McElhinny, M. W. (*both, Physics Dept. Rhodes Univ., Grahamstown*), **Behaviour of the E1 layer during the solar eclipse of Dec. 25, 1954.** (In: **Solar eclipses and the ionosphere: a symposium . . .** ed. by W. J. G. Beynon and G. M. Brown. London, Pergamon, **1956.** p. 74–80. 4 figs., 10 refs., 13 eqs.) **DWB**—Two methods are attempted to explain deviations in the maximum electron density of the E1 layer observed during the eclipse from the expected effects from a solar disk of uniform intensity. Some success is met by postulating more intense regions on the solar surface and correlating those with astronomical observations. In the second method, a temperature variation with time of day is considered; while this indicates a reasonable diurnal variation on a normal day, it points to a rise in temperature during the middle part of the eclipse instead of an expected drop, and hence an explanation in terms of temperature variation must be rejected. *Subject Headings:* **1. Eclipse effects on E1 layer 2. Solar eclipse, Dec. 1954 3. Electron density in E layer.**—*Authors' abstract.*

9.6–269 551.590.24:551.510.535

Thomas, J. O. and Robbins, A. R. (*both, Cavendish Lab., Cambridge*), **Movements in the F2 layer of the ionosphere during some solar eclipses.** (In: **Solar eclipses and the ionosphere: a symposium . . .** ed. by W. J. G. Beynon and G. M. Brown. London, Pergamon, **1956.** p. 94–101. 4 figs., table, 10 refs., 3 eqs.) **DWB**—Five different sets of ionosphere soundings made during eclipses have been analysed in an attempt to see whether vertical transport of electrons plays an important part in the F2 layer during an eclipse. The assumption was made that the rates of production and loss of electrons were those tentatively suggested by Ratcliffe et al. (1956). It has been found that the five sets of observations lead to fairly similar conclusions. Vertical movements of importance seem to have occurred during the eclipses. Their possible causes are considered. *Subject Headings:* **1. Eclipse effects on F2 layer 2. Ionospheric soundings.**—*Authors' abstract.*

VISIBILITY

See: **Greenland Ice Cap and electronic trail markers,** 9.6–26; **Snow ceilings, Labrador, Canada** (Muttit), 9.6–74.

OPTICAL PHENOMENA

9.6–270 551.593

Orlicz, Michał, **O niektorych zjawiskach optycznych obserwowanych na Kasprowym Wierchu.** [On some optical phenomena observed at the Kasprowy Wierch Observatory.] *Przegląd Meteorologiczny i Hydrologiczny*, Warsaw, 6(1/2):81–88, **1953.** 6 tables, 6 refs. English summary p. 88. **DWB**—Results of observations of optical phenomena, such as halo, (lower) parhelion, glory, brocken bow and rainbow, as observed at Kasprowy Wierch Observatory in the Tatra Mountains (alt. 1988 m) during the period 1938–1951 are described, discussed

and tabulated according to the time and frequency of their appearance. *Subject Headings:* **1. Optical phenomena 2. Kasprowy Wierch Observatory, Poland.**—*A.M.P.*

9.6–271 551.593.5:535.4

*Gumprecht, R. O. and Sliepcevich, C. M., **Tables of light-scattering functions for spherical particles.** Ann Arbor, Engineering Research Institute, Univ. of Michigan, **1951.** 574 p. Almost entirely tables, 6 refs. **DWB**—Extensive tables of total scattering coefficient (K) and the 90° intensity functions (i_1 and i_2) for 40 values of α (circumference of particle divided by wave-length of incident light) from $\alpha=1$ to $\alpha=400$ for 6 indices of refraction from 1.20 to 1.60. Bureau of Standards tables give functions for $\alpha=0.5$ to $\alpha=6.0$ for 4 indices of refraction (1.33 to 20). Tables are included for calculating intensity functions for other angles than 90°. The computations were based on MIE's (1908) theory of scattering from spherical particles, and the lengthy computations were made on an ENIAC computer in 2 weeks. *Subject Headings:* **1. Scattering of light 2. Light scattering tables 3. Mie's theory 4. Handbooks.**—*M.R.*

9.6–272 551.593.55 551.510.536:523.59

Rozhkovskiĭ, D. A., **Fotograficheskie izofoty protivosiianiia po nabliudeniiam v 1948 i 1949 gg.** [Photographic isophotes of counterglow according to observations made in 1948 and 1949.] *Astronomicheskiĭ Zhurnal*, Moscow, 27(1):34–40, **1950.** 5 figs., 2 tables, 2 refs., 10 eqs. **DLC**—The method and results of photographic photometry of counterglow carried out in autumn 1948 and spring 1949 at the Astro-physical Observatory of Alma Ata, with consideration of various components of the night sky luminescence, are described and explained. Author points out the variability of the shape and brightness of the counterglow and calculates its horizontal parallax. It has been found that separation of the components of night sky luminescence by FESENKOV's method brings out isophotes having definite regularities. The author indicates the possibility of interpreting these regularities by the luminescence of a complex of particles, and determines the law of the change of the spatial density of this complex. *Subject Headings:* **1. Counterglow 2. Night sky luminescence 3. Alma Ata, U.S.S.R.**—*A.M.P.*

9.6–273 551.593.62

Boyer, Carl B. (*Brooklyn College, N. Y.*), **William Gilbert on the rainbow.** *American Journal of Physics*, New York, 20(7):416–421, Oct. **1952.** 3 figs., 20 refs. **DWB**—Critical review of chapters 10–13, Book 4, of GILBERT's **De Mundo** (1651) in which the royal physician developed his interpretation of the rainbow phenomenon and refuted earlier theories. The author of the review believes that in his rainbow theory, based entirely upon the assumption of reflection, the "father of the science of electricity" assembled ideas—"vague, speculative, and tediously repeated"—which fall short of the standards of scientific discipline set by some of his other works. Three of GILBERT's own diagrams are reproduced from **De Mundo.** *Subject Headings:* **1. Rainbows 2. Critical reviews 3. Gilbert, William.**—*G.T.*

9.6–274 551.593.62

Deodhar, G. B. (*Physics Dept., Allahabad Univ.*), **Lunar rainbows.** *Current Science*, Calcutta, 23(10):320, Oct. **1954. DLC**—A lunar rainbow, the only one witnessed by the author in his 32-yr scientific career, is described. The rainbow was observed at Allahabad during a shower around 8.30 p.m. on July 16, 1954. It had a primary and a secondary bow. To the author's knowledge, no lunar rainbow had ever been reported in India. *Subject Headings:* **1. Lunar rainbows 2. India.**—*G.T.*

9.6–275 551.593.62

Oblakov, F. V., **Raduga noch'iu.** [Night rainbow.] *Meteorologiia i Gidrologiia*, No. 9:33, Sept. **1956. DWB, DLC**—A report on a nocturnal halo observed August 2, 1955 in the Moikov district. The air was still and clear, cloudiness in the southeast was scale 3 and a full moon shone. Thunder was heard at 2125 hours and raindrops began to fall at that time. The cloudiness was 1/4 Ac, Cb. The halo appeared in the southwest at 2126 hrs. The behavior of the halo up until its disappearance is described. *Subject Headings:* **1. Lunar rainbows 2. Moikov District, U.S.S.R.**—*I.L.D.*

ELECTRICAL PHENOMENA

See also: **Ionospheric electron density calculation** (Becker), 9.6–147; **Humidity effects on corona discharges** (Arai), 9.6–193.

9.6–276 551.594

Medi, E., **Investigations on the distribution of electric charge in the atmosphere** *I.U.G.G. Association of Meteorology, Rome, Sept. 1954, Scientific Proceedings.* London Butterworth, **1956.** p. 398–400. **DWB**—The author describes a series of experiments fo studying the distribution of space charges under specially designed laboratory conditions i which charges are produced in a chamber by the rapid evaporation of water by spraying unde pressure and reduction of pressure, etc. In the behavior of the charge left to itself, there i observed a rapid decrease in the beginning and then a very strong stability. A theory o ionization of drops is proposed to explain this phenomenon. The surface of a drop having spherical symmetry is considered as the surface of a conductor with free electrons inside an the double electron layer on the outside. "These electrons, evidently, are subjected to the motion of thermal agitation and describe orbits partially external to the mean thickness of the double stratum." The application of this theory to the laboratory observations and to storm clouds is illustrated. *Subject Heading:* **1. Electric charge distribution.**—*I.L.D.*

9.6–277 551.594.1/2:551.515.8

Giorgi, M. and Molina, F. (*Rome*), **Sur les rapports entre le champ électrique et des masses d'air.** [Relation between the electric field and air masses.] *I.U.G.G. Association of Meteorology, Rome, Sept. 1954, Scientific Proceedings.* London, Butterworth, **1956.** p. 389 391. fig. **DWB**—Following the procedure of Israël, the authors attempt to analyze from a topographic and climatologic point of view for Rome the relationship between atmospheric electricity field and air mass. The results of observations made over the period 1951–1953 are presented in curves. In the case of warm air masses, the diurnal potential gradient show a double oscillation with the first maximum (a little before local noon) being more pronounce than the second (between 17 and 18 hrs). In the case of cold air a simple oscillation is observe with one maximum appearing immediately after mid-day. Finally the amplitude of the oscillation is generally greater in cold than in warm air. *Subject Headings:* **1. Atmospheric electricity-air mass relationships 2. Potential gradient 3. Rome, Italy.**—*I.L.D.*

9.6–278 551.594.1/2:551.574.1:551.55

Israël, H., **Kondensationskerne im Rahmen der Luftelektrizität.** [Role of condensation nuclei in atmospheric electricity.] *Geofisica Pura e Applicata,* Milan, 36:182–200, Jan./Apri **1957.** 21 figs., 15 refs., 5 eqs. German and English summaries p. 182. **DLC**—The "sunrise effect" is discussed and examples from various parts of the earth, seasons, elevations, etc. cited and illustrated by graphs. The role of condensation nuclei in producing this effect o the atmospheric electricity processes, the effect of air masses, convection or stability (austausch inversions, etc., lead to conclusions that the effect is caused by "austausch" by means of re distribution of charged nuclei or ions. *Subject Headings:* **1. "Sunrise effect" on atmospheric electricity 2. Nuclei effects on potential gradient 3. Austausch effects on potential gradient** —*M.R.*

9.6–279 551.594.1/2

Kawano, M., **The local anomaly in the atmospheric electric field in a large city.** (Summary) *I.U.G.G. Association of Meteorology, Rome, Sept. 1954, Scientific Proceedings.* London Butterworth, **1956.** p. 396. **DWB**—Continuous observations of the atmospheric electricity field, conductivity and space charge carried out during 1949–1951 at Hongo (Tokyo City showed that 1) The diurnal variation in the electric field is remarkably different from tha obtained at stations in rural areas, and its changes with seasons. 2) The correlation betwee the field and conductivity in their diurnal variation is close, and also that between the field and space charge in their second harmonics of diurnal variation is very close. 3) Even o meteorologically quiet days, short-period variations and abnormal changes of short duration occur very often. *Subject Headings:* **1. Atmospheric electricity anomalies 2. Diurnal at mospheric electricity variations 3. Tokyo, Japan.**—*From Author's summary.*

9.6–280 551.594.11

Koenigsfeld, L. (*Inst. Royal Met. de Belgique*), **Study of the variation of potential gradient with altitude and correlated meteorological conditions.** *U. S. Air Force. Cambridge Research Center, Geophysical Research Papers*, No. 42:21–26, Nov. **1955.** 3 figs., 2 refs. Also his: **Le gradient de potentiel en altitude (Mesures obtenues par radiosonde).** *I.U.G.G. Association of Meteorology, Rome, Sept. 1954, Scientific Proceedings.* London, Butterworth, **1956.** p. 387. **DWB**—The variation of potential gradient with altitude has been observed during 28 soundings at Uccle between Dec., 1953, and April, 1954. The patterns of potential gradient are found to correspond to meteorological conditions during the soundings. In particular, the type of air mass has an important influence on the potential gradient. The possible future use of atmospheric electrical measurements in meteorology is discussed briefly. *Subject Headings:* **1. Potential gradient variations 2. Weather-atmospheric electricity relationships.** —*Author's abstract.*

9.6–281 551.594.11

*Paramonov, N. A., **Nekotorye rezul'taty nabliudeniĭ za gradientom elektricheskogo potentsiala v atmosfere nad territorieĭ Sovetskogo Soiuza.** [Some results of observations on the electrical potential gradient in the atmosphere over the territory of the Soviet Union.] *Leningrad. Glavnaia Geofizicheskaia Observatoriia, Trudy*, 58(120):81–99, **1956.** 4 refs., 5 tables. **DLC**—The conditions, methods of observation and presentation of the data on the atmospheric electric potential gradient in the U.S.S.R. are described briefly. A table with information on the principal stations of the U.S.S.R. at which atmospheric electric potential gradients are measured and the types of observations made at each is presented. Extensive numerical and graphical data are given on the mean annual, seasonal and daily variations of the electric potential gradient. *Subject Headings:* **1. Atmospheric potential gradient 2. U.S.S.R.** —*I.L.D.*

9.6–282 551.594.11

Vonnegut, B.; Moore, C. B.; and Blume, M. (*all, Arthur D. Little, Inc., Cambridge, Mass.*), **Preliminary investigation of the distribution of space charge in the lower atmosphere.** (In: Conference on the Physics of Cloud and Precipitation Particles, Sept. 1955, **Proceedings.** Pub. N. Y., Pergamon Press, **1957.** p. 131–141. 13 figs., 6 refs.) **DLC** (QC921.5.U5), **DWB**—Measurements from a small airplane have been made of the vertical distribution of the fair-weather atmospheric electrical potential gradient. The measurements, the majority of which were made over eastern Massachusetts, show large departures from the classical picture of the variation of the electrical field with altitude. Usually there are one or more regions in the lower atmosphere in which the potential gradient increases rather than decreases with increasing altitude. These regions usually are found at inversions and at haze levels that probably mark discontinuities in the atmospheric conductivity. These measurements show that frequently there are regions of negative as well as positive space charge in the lower atmosphere. *Subject Heading:* **1. Potential gradient vertical distribution.**—*Authors' abstract.*

9.6–283 551.594.21:551.515.3

Vonnegut, B. and Moore, C. B., **Electrical activity associated with the Blackwell-Udall tornado.** *Journal of Meteorology*, 14(3):284–285, June **1957.** fig., 14 refs. Reply: Ross Gunn, *Ibid.*, 285–286. **DWB**—Produces evidence against R. Gunn (*J. of Met.*, 13(3):269–273, June **1956**; *see* 7.10–291, Oct. 1956, *MAB*) that the tornado is not primarily an electric phenomenon. Large electric fields and current densities exist in the interior of the funnel and on the ground directly below, but not basically different from ordinary thunderstorms. Electric discharges occurred at >20/sec. Gunn objects to comparison of sferics with electric field data. *Subject Headings:* **1. Thunderstorm electricity 2. Tornado electricity.**—*C.E.P.B.*

9.6–284 551.594.21

Workman, E. J. (*New Mexico Inst. of Mining and Tech., Socorro, N. M.*), **Thunderstorm charge generation.** (In: Conference on the Physics of Cloud and Precipitation Particles, Sept. 1955, **Proceedings.** Pub. N. Y., Pergamon Press, **1957.** p. 411–412. 2 refs.) **DLC** (QC921.5.U5), **DWB**—Laboratory experiments designed to measure the amount and sign of

the charge separated by two ice formations in rubbing contact are described. In a simulated thunderstorm environment, it is found that a graupel-crystal collision process can lead to large amounts of charge separation. The experiments demonstrate, in a general way, that the warmer or the more contaminated ice becomes negatively charged. Further experiments indicate that the charge separated during rubbing contact is due to the freezing potential which arises as a result of resolidification of a liquid layer formed at the point of contact. *Subject Heading:* **1. Thundercloud electrification experiments.**—*Author's abstract.*

AURORAS

9.6–285 551.594.5:539.1

Bennett, Willard H. (*U. S. Naval Res. Lab., Wash., D. C.*), **Proposed measurement of solar stream protons.** (In: Van Allen, James A. (*ed.*), **Scientific uses of earth satellites.** Ann Arbor, Univ. of Michigan Press, **1956.** p. 194–197. 3 figs., 4 refs.) **DWB, DLC**—Measurements of solar protons in their free orbits and later in captive orbits (at ca 100 km) can be made only in auroral zones with an artificial satellite which would pass over the earth's poles. The equipment for measuring these solar stream protons at times of strong auroras (0 to 10^8 protons/cm²/sec) is described and illustrated. The Störmertron has been used in the laboratory to produce scale models. An ionization chamber is located at an edge of the satellite away from axis of it's rotation. Both types of equipment are illustrated. *Subject Headings:* **1. Solar stream proton measurement 2. Satellite instrumentation 3. Störmertron 4. Auroral proton streams.**—*M.R.*

9.6–286 551.594.5

Nordlichtbeobachtung. [Aurora observation.] *Zeitschrift für Meteorologie*, 11(2):60–61, Feb. **1957.** 6 figs. **Weitere Nordlicht-Beobachtungen vom 21.–22.1.1957.** *Ibid.*: 62–63. **DLC**—The staff of Fichtelberg Observatory, 50°26′N, 12°57′E, report fully on an intense aurora on Jan. 21–22, 1957 (18 h 30 m–0 h 30 m). Short reports are included from Inselsberg, Altenburg, Wittenberg and Olbersdorf/Sa. *Subject Heading:* **1. Auroral descriptions.**—*C.E.P.B.*

9.6–287 551.594.5

Owren, Leif, **Het poollicht.** [The aurora.] *Hemel en Dampkring*, The Hague, 53(11): 197–198, Nov. **1955.** 2 colored plates. **DLC, DWB**—The author describes the appearance of the aurora borealis, considers the time and place where it is best seen and discusses the relationship between the aurora and solar activity, origin of the aurora and its effects upon the earth. Two color photographs of auroras are included in this article. *Subject Headings:* **1. Aurora borealis 2. Auroral photographs 3. Auroral-solar relationships.**—*I.L.D.*

9.6–288 551.594.5:551.521.7

Vegard, L., **Intensity variations of auroral hydrogen lines and the influence of the solar proton radiation on the auroral luminescence.** *Geofysiske Publikasjoner*, Oslo, 19(4), **1955.** 10 p. fig., 2 tables, 30 refs. **DLC, DWB**—The existence of protons in solar ray bundles, causing auroras, required by theory, was proved observing broadened and displaced $H\beta$ lines. Electron velocity is much greater than the proton velocity in a bundle. Increase in proton velocity increases the polar distance of aurorae. Relative intensity of H lines shows a pronounced lat. effect. This intensity increases also with altitude. Excitation with positive rays produces about 100° higher temperature than that of the surrounding gas. Proton excitation in red aurorae is discussed. *Subject Headings:* **1. Auroral hydrogen lines 2. Solar proton radiation.**—*A.A.*

SFERICS AND RADIO METEOROLOGY

See also: **Ionospheric radio wave demodulations** (Aitchison), 9.6–146; **Ionospheric reflection, Hungary** (Flórían), 9.6–149; **Eclipse effects on radio waves, Nigeria** (Piggott), 9.6–265.

9.6–289 551.594.6:523.78:551.508.86

Bost, R. (*Nat. Lab. of Radio Electricity, Bagneux/Seine*), **Influence de l'éclipse du 30 juin 1954 sur la propagation des atmosphériques sur la fréquence de 27 kc/s.** [Influence of the

June 30, 1954 eclipse on the propagation of atmospherics on the 27 kc/s frequency.] (In: **Solar eclipses and the ionosphere: a symposium** . . . ed. by W. J. G. Beynon and G. M. Brown. London, Pergamon, **1956.** p. 132–136. 3 figs.) **DWB**—A brief account is given of recordings of atmospherics on several frequencies during the eclipse of June 30, 1954. Quite pronounced enhancement was observed for the weaker atmospherics on 27 kc/s, but no eclipse effects were observed at frequencies in the range 4–12 kc/s. *Subject Headings:* **1. Eclipse effects on sferics 2. Solar eclipse, June 1954.**—*Author's abstract.*

9.6–290 551.594.6:551.508.86

Chapman, J. (*Courtald's Ltd., Coventry, Eng.*) and Pierce, E. T. (*Cavendish Lab., Cambridge, Eng.*), **Relations between the character of atmospherics and their place of origin.** *Institute of Radio Engineers, N. Y., Proceedings,* 45(6):804–806, June **1957.** fig., 3 tables, 8 refs. **DLC**—From recent experimental work at Cambridge, Eng., it is shown that atmospherics originating from different geographical localities are systematically different in character, even when the distances of propagation are the same and there is no reason to anticipate appreciable dissimilarities in the ionospheres along the respective propagation paths. Detailed and precise information is given of how these "geographical" effects may be traced by recording and classifying types of waveforms. It is also shown that the effects are apparent for observations of atmospherics at fixed frequencies between 0.65 and 27 kc. No attempt is made to assign a reason for the geographical phenomena, but the most promising approach would seem to be by considering differences in the conductivity of the earth's surface, and in particular, those between land and sea. *Subject Headings:* **1. Sferics origin 2. Sferics wave forms.**—*Authors' abstract.*

9.6–291 551.594.6:551.590.24:551.508.86

Ehmert, Alfred and Revellio, K. (*both, Max-Planck Inst. für Physik der Stratosphäre, Weissenau bei Ravensburg*), **The influence of the solar eclipse of June 30, 1954 on low-frequency atmospherics.** (In: **Solar eclipses and the ionosphere: a symposium** . . . ed. by W. J. G. Beynon and G. M. Brown. London, Pergamon, **1956.** p. 126–131. 7 figs., 2 refs.) **DWB**—Records of atmospherics on 13 kc/s obtained at Weissenau during the solar eclipse are compared with other European records. For small atmospherics from distant centers, the variations show a distinct peak during the eclipse. This peak is absent for stronger atmospherics of the same frequency and also for higher frequencies from nearer discharge centers. Narrow-sector d.f. observations at Payerne and Zurich, together with meteorological information, enable the source of these atmospherics to be located near the Azov Sea and the Caucasus at distances from 2000 to 2500 km. Best transmission occurred when the sun was more than 75% obscured at both reflection points for the doubly reflected waves. *Subject Headings:* **1. Eclipse effects on sferics 2. Solar eclipse, June 1954.**—*Authors' abstract.*

9.6–292 551.594.6:551.508.86

Kawabata, Kin-aki (*Dept. of Astronomy, Tokyo Univ.*), **The relations between the noise storms and the intensity of the coronal lines.** [Abstract only.] *Japan. Science Council. Ionosphere Research Committee, Report of Ionosphere in Japan,* 7(1):38, **1953. DWB**—The relation between the noise storms at a frequency of 200 Mc/s observed at Nera, Mt. Stromlo, and Mitaka and the intensity of the green line β 5303 Å observed at Sacramento Peak and Climax is discussed for the period from October 1951 to June 1952. The association of the noise storms with the intensity of the green line is confirmed. The intensity of the green line is increased above and near the sunspot which associate with strong magnetic field and seems to produce the storm radiation. There is a tendency that a sunspot, even if its magnetic field is strong, has little chance of producing a noise storm, unless the intensity of the green line is increased above and near the sunspot. The noise storms are also compared with the intensity of the red line β 6734 Å, observed at Sacramento Peak and Climax for the period from October 1951 to January 1952. There is also a tendency that the intensity of the red lin (is increased above and near a sunspot which seems to produce storm radiation, although this tendency is less conspicuous than in the case of the green line. It may be probable that the electron density of the corona is increased near the sources of the storm radiation. *Subject Headings:* **1. Radio noise bursts 2. Coronal emission lines.**—*Author's abstract.*

9.6–293 551.594.6:551.547:551.508.86

Malkowski, G., **Über die Lage von Spheric-Peilungen in der 500 mb-Karte.** [On the position of sferics soundings in the 500-mb chart.] *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. A*, 10(1):101–106, **1957.** 2 figs., 3 tables, 4 refs. German, English and French summaries p. 101. **DWB**—Sferics centers in Europe are classified according to synoptic situation at 500 mb. The majority (40%) are in low regions, only 1.2% in highs. The frequency distribution is made up of two curves, a dynamic (maximum at low pressure) and an "air mass" curve (maximum at transitions). The positions of centers are also related to divergences and convergences and to wind directions. *Subject Headings:* **1. Sferics origin 2. Upper air pressure.**—*C.E.P.B.*

9.6–294 551.594.6:621.396.8:551.508.86

Nawrocki, P. J., **Investigation of atmospheric radio noise.** Florida. Univ., Gainesville Engineering and Industrial Experiment Station, Contract AF 19(604)-876, Scientific Report No. 13, Nov. 1, **1956.** 35 p. 13 figs., 8 refs., 22 eqs. **DWB**—Investigation of the electromagnetic field components (E_z and H_z) of the ground wave from individual sferic pulses is initiated. Preliminary experiments indicate that H_z exceeds the theoretical value obtained from SOMMERFELD's theory, and that H_z and E_z probably have a common functional dependence upon the distance of propagation. *Subject Heading:* **1. Radio noise.**—*Author's abstract.*

PART II. RECENT LITERATURE ON DYNAMIC AND PHYSICAL OCEANOGRAPHY (SUPPLEMENT)

Compiled by: *Mary L. Rice*

INTRODUCTORY NOTE

The study of the general circulation and surface temperature of the oceans is given a very high priority among the problems confronting meteorology today. In the report on **Research and Education in Meteorology** issued by the National Academy of Sciences, Committee on Meteorology dated Jan. 25, 1958 (p. 16) is found the following statement:

"4. The general circulation of the oceans. An understanding of the oceanc irculations is a prerequisite to a physical explanation of climate, since the atmosphere and the oceans form a linked dynamical system; changes in the surface temperatures of the oceans produce atmospheric changes, and these, in turn, produce changes in the ocean circulations."

Hence, it is important that meteorologists and oceanographers working on boundary layer problems have available the most recent references to results of research in this borderline field, including all of the published data from the various oceans emanating from physical oceanographic expeditions, surveys, cruises or routine observations. The limited space we could devote to backlog material in this field in the April and May issues of **Meteorological Abstracts and Bibliography** did not nearly exhaust the already abstracted literature in this category, so another issue is being devoted to this subject. Even this fairly extensive compilation leaves many dozens of unabstracted articles in process in our possession. These will be run from month to month in the usual section on **Oceanography and Marine Meteorology.**

In order to facilitate locating articles on various subjects and areas which are run in this and the preceding two issues, and other material in the past nine volumes of *MAB*, a cumulative subject and geographic outline is provided. References to articles in earlier issues are in parentheses.

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1945–1947

9F–1 551.465

Maksimov, I. V., **K opredeleniiu poriadkovoĭ velichiny godovogo stoka vod Tikhogo okeana v Severnyĭ Ledovityĭ okean cherez Beringov proliv.** [Determining the relative volume of the annual flow of Pacific waters into the Arctic Ocean through Bering Strait.] *Problemy Arktiki*, Leningrad, No. 2:51–85, **1945. DLC.** Translation into English by Valda Dreimanis, issued by American Meteorological Society, under Contract AF 19(604)-1364, June **1956.** 13 p. 3 figs., table, 2 footrefs. Available **DWB** (532.54.M235de)—Charts show cross sectional isotachs of current velocity from Cape Dezhnio to Cape Prince of Wales (Alaska) for summer and for winter, based on data from a selection of the 70 stations operated more or less regularly from 1925–39. The annual flow from the Pacific into the Arctic Ocean through Bering Strait is estimated to be 30,354 km³ compared with the average annual flow of the Lena of 482 km³, of the Ob and Yenisei of 699 km³ and of the Gulf Stream of 746,496 km³. Variations in time (seasonal and annual) and space across the strait are discussed. *Subject Headings:* **1. Bering Strait water circulation 2. Water exchange Pacific-Arctic 3. Ocean current isotach charts. I. Dreimanis, Valda** (*trans.*).—*M.R.*

9F–2 551.526.6:536.22

Shtokman, V. B., **Vertikal'noe rasprostranenie teplovykh voln v more i kosvennye metody opredeleniia koeffitsienta teploprovodnosti.** [Vertical distribution of thermal waves in the sea and indirect method for determining the coefficient of thermal conductivity.] *Akademiia Nauk SSSR. Institut Okeanologiĭ, Trudy*, 1:3–46, **1946.** 13 figs., 7 tables, 6 refs., 126 eqs. English summary p. 46. **DLC**—A methodical study of the computation of the coefficient of turbulent thermal conductivity in the sea using Schmidt's method, based on the application of Fourier's formula to the ocean layer of greatest possible width. The vertical propagation of thermal waves is investigated for the case when the coefficient of turbulent thermal conductivity (Kz) decreases exponentially with increasing depth. The effect of sun radiation absorption in the upper layer of the sea on the propagation of thermal waves of a 24 hr period is treated and the magnitude of errors possible in calculations of Kz discussed. *Subject Headings:* **1. Coefficient of turbulent thermal conductivity 2. Thermodynamics of the sea.**—*From author's abstract.*

9F–3 551.46(261.3)

†*Slaucitajs, L., **Ozeanographie des Rigaischen Meerbusens, Teil I, Statik.** [Oceanography of the Gulf of Riga, Pt. 1, Statics.] *Hamburg. Baltic University, Contributions*, No. 45, **1947.** 110 p. 69 figs., 23 tables, 63 refs., eqs. Table of contents, p. 3, and summary, p. 54–55, in English. **DWB**—A comprehensive, well-illustrated monograph on a previously little studied area including discussion of the morphometry of the Gulf; sea level and its relations to hydrometeorological conditions; water balance (incl. evaporation and precip.), temp., salinity and density of surface layer and deep water. *Subject Headings:* **1. Oceanography surveys 2. Gulf of Riga.**—*M. P. Kramer.*

1950

9F–4 551.311.1:551.46

Dobrovol'skiĭ, A. D., **K voprosu ob osolonenii poverkhnostnykh sloev moria pri l'doobrazovanii.** [Increase of salinity in the surface layers of the sea during ice formation.] (In: Akademiia Nauk SSSR, **Pamiati Iuliia Mikhaĭlovicha Shokal'skogo.** Ed. by A. K. Leonov. Moscow, Akademiia Nauk SSSR, **1946–1950.** Vol. 2:236–242. 2 figs., 4 eqs.) **DLC** (GC30.S48A7)—Zubov's formula for increase in salinity during ice formation, dependent on the depth of vertical circulation, is modified for a case when the newly-formed ice is carried away by the wind, apply in his formula for ice of varying density. *Subject Headings:* **1. Salinity 2. Ice thickness growth. I. Zubov, N. N.**—*A.A.*

9F–5 551.556:551.465

Ichiye, Takashi, **A note on wind-driven currents under a circular wind stress.** *Oceanographical Magazine*, Tokyo, 2(2):45–48, June **1950.** 3 figs., 3 refs., 6 eqs. **MH-BH**—Equations describing the motion of ocean currents under a circular stress are developed. *Subject Headings:* **1. Wind driven currents 2. Ocean currents 3. Oceanographic research.**—*I.L.D.*

9F–6 551.551:551.465

Inoue, Eiichi, **The application of turbulence theory to oceanography.** *Meteorological Society of Japan, Journal, 2nd Ser.*, 28(11):420–424, Nov. **1950.** fig., 10 refs., 10 eqs. In Japanese; English summary p. 424. **MH-BH**—The law that the coefficient of turbulent diffusion of the atmosphere is proportional to the 4/3 power of the scale of the phenomena is successfully applied to oceanic turbulence, and the concept of turbulent Reynolds number introduced. *Subject Heading:* **1. Oceanic turbulence.**—*C.E.P.B.*

9F–7 551.465:551.311.184

Shuleĭkin, V. V., **Teoriia dreĭfa ledianykh poleĭ v ee sovremennom sostoianii.** [Drift theory of ice fields in its present state.] (In: Akademiia Nauk SSSR, **Pamiati Iuliia Mikhaĭlovicha Shokal'skogo.** Ed. by A. K. Leonov. Moscow, Akademiia Nauk SSSR, **1946–1950.** Vol. 2:63–81. 5 tables, 21 refs.) **DLC** (GC30.S48A7)—The author defends his theory of ice drift, which is based on the consideration of the friction between air and ice (coefficient 0.02), as well as between ice and water (coefficient 0.008–0.01), showing that the theoretical results agree with measurements made during the "Severnyĭ Polius" Expedition. In particular the ice drift is about twice as fast as the speed of the ocean current, the deviation angle between wind and ice drift decreases with increasing wind speed, and the ratio between the speed of the ice drift and the wind speed increases with the wind. One theory holds for the drift near a coast (Greenland), if the coastal effect on the ocean current is considered. *Subject Headings:* **1. Ice drift theory 2. Ocean currents 3. "Severnyĭ Polius Expedition," 1937–1938 4. East Greenland current 5. Arctic Ocean.**—*A.A.*

9F–8 551.577:551.573(26)

Timonov, V. V., **Glavnye osobennosti gidrologicheskogo rezhima Belogo Moria.** [Main characteristics of the hydrological regime of the White Sea.] (In: Akademiia Nauk SSSR, **Pamiati**

Iuliia Mikhaĭlovicha Shokal'skogo. Moscow, Akad. Nauk SSSR, **1946–1950.** Vol. 2:206–235; 5 tables, 21 refs.) **DLC** (GC30.S48A7)—Discusses the water balance of the White Sea up to the narrowest section of the strait (annual runoff from the continent 185 km³, precipitation 19 km³, evaporation 13 km³, discharge to and inflow from the Barents Sea approximately 2200 km³ and 2010 km³). Furthermore the influence of atmospheric pressure and winds on the hydrologic regime of the sea is discussed, as well as the effect of turbulent mixing due to convection, waves, etc. Some sections deal with the currents and the thermohaline structure of the sea. *Subject Headings:* **1. Water balance of seas 2. Ocean currents 3. Marine hydrology 4. White Sea.**—*A.A.*

9F–9 551.46(041)

†Woods Hole Oceanographic Institution, **Author index of the Collected Reprints and Papers in Physical Oceanography and Meteorology of the Woods Hole Oceanographic Institution, 1933–1949.** (**1950?**) 50 p. Mimeo.—Titles, references, and numbers of about 500 oceanographic papers, arranged by author. *Subject Heading:* **1. Oceanography reprint collections.**—*M.R.*

1951

9F–10 551.46(09)

Bhattacharya, Prabhat K., **History of the development of oceanography.** *Science and Culture*, 17(5):202–206, Nov. **1951.** 10 refs. **DLC**—A brief history of early oceanography and the birth of the modern science is given. The scope and problems of physical-chemical oceanography, marine biology, and submarine geology are outlined. *Subject Heading:* **1. History of oceanography.**—*M. P. Kramer.*

9F–11 532.59:551.466

Davies, T. V., **The theory of symmetrical gravity waves of finite amplitude I.** *Royal Society of London, Proceedings, Ser. A*, 208:475–486, **1951.** fig., table, 67 eq. **DWB**—An exact discussion of the two-dimensional propagation of waves in an incompressible fluid of infinite depth, from beginning to breaking point. As the wave increases in height the kinetic energy increases more rapidly than the potential energy and the kinetic energy of horizontal motion increases more rapidly than that of vertical motion. *Subject Headings:* **1. Gravity waves 2. Wave theory.**—*C.E.P.B.*

9F–12 551.46:551.556.4

Defant, Albert, **Windstau und Auftrieb an ozeanischen Küsten.** [Wind pressure and thrust current on ocean coasts.] *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. A*, 4:296–308, **1951.** 8 figs., 13 refs. Summaries in German, English, French p. 296–297. **DWB**—A theoretical study of the effects of wind on the circulation and level of the sea off a coast, based mainly on the results of Sverdrup and Fleming (1941) in 1937 cruises off California coast. Effects are analyzed into weakening or strengthening of coastal current and disturbances perpendicular to the coast. The latter are closely reproduced by those calculated from a simple theoretical model. *Subject Headings:* **1. Wind effects 2. Sea level variations 3. California Coast.**—*C.E.P.B.*

9F–13 551.556:551.465

Dietrich, Günter, **Oberflächenströmungen im Kattegat, im Sund und in der Beltsee.** [Surface currents in the Kattegat, the Sound (Öresund) and the Belt.] *Deutsche Hydrographische Zeitschrift*, 4(4–6):129–150, **1951.** 22 figs., 5 tables, 38 refs. German, English and French summaries p. 129. **DWB**—Observations at Lightships show great variations in the surface currents, due partly to variations in outflow from Baltic and partly to effect of wind. Relations between wind (pressure gradient) and direction of current are analyzed. The results are set out in a series of polar diagrams for the various lightships, and in charts showing the current systems with winds from N, E, S and W of forces 3 and 6. *Subject Headings:* **1. Ocean currents 2. Wind effects 3. Baltic.**—*C.E.P.B.*

9F–14 551.46/5:551.526.6

Fukuoka, J., **On the oceanographical conditions of the sea area east off Erimozaki, Hokkaido.** *Japan. Central Meteorological Observatory, Oceanographical Report*, 2(1):87–92, May **1951.** 3 figs., 2 tables, 3 refs. In Japanese; English summary p. 91–92. **DWB**—Temperature-salinity (T-S) diagrams for the region near 42°N, 147°E were classified as either warm current type or cold current type. Comparison of the T-S diagrams with prevailing wind direction and air temperature data indicated a relationship between the development of a cold current and these two meteorological factors. *Subject Headings:* **1. Temperature-salinity diagrams 2. Ocean currents 3. Japan.**—*M. P. Kramer.*

9F–15 551.464

Hishida, Kozo (*Maisuru Marine Obs.*), **Note on the relation of salinity and turbidity in the sea water.** *Oceanographical Magazine*, Tokyo, 3(3):103–106, Sept. **1951.** 8 refs., 8 eqs. **DLC**—

Calculated values of light absorption in a NaCl solution are compared with those calculated for pure water. The comparison confirms the author's laboratory findings that turbidity changes due to a direct effect of salinity are negligible. *Subject Heading:* **1. Salinity-turbidity relationships.**—*G.T.*

9F–16 532.593:551.46:551.556

Ichiye, Takashi, **On the propagation of long waves.** *Kobe, Japan. Marine Observatory, Memoirs*, 9:34–39, March **1951.** graphs, refs., eqs. **DWB**—Propagation of tidal waves or hurricane swells treated theoretically with application to effect in Osaka Bay. *Subject Headings:* **1. Wind waves 2. Osaka Bay, Japan.**—*M.R.*

9F–17 551.465

Ichiye, Takashi (*Kobe Marine Obs.*), **On the surface wave in a current.** *Oceanographical Magazine*, Tokyo, 3(1):23–26, March **1951.** 2 figs., ref., 12 eqs. **DWB**—Making use of a perturbation equation developed by P. D. THOMPSON (1950), the author proposes a mathematical treatment of surface waves in (a) a horizontally uniform current system which is variable with depth and (b) in a current divergent or convergent in one dimension. *Subject Heading:* **1. Surface waves.** —*G.T.*

9F–18 551.465

Ichiye, Takashi (*Kobe Marine Obs.*), **On the variation of oceanic circulation, Pts. 1–4.** *Oceanographical Magazine*, Tokyo, 3(2):79–82, June **1951**; 3(3):89–96, Sept. **1951**; 4(2):37–48, Oct. **1952**; 5(1):23–44, June **1953. Pts. 5–6,** *Geophysical Magazine*, Tokyo, 26(4):283–342, Aug. **1955**; 25(3/4): 185–217, March **1954. Pt. 7,** *Oceanographical Magazine*, Tokyo, 6(1):1–14, June **1954.** Numerous figs., tables, refs., eqs. **DLC, DWB**—On the basis of temperature, chlorinity and current observations, a thorough analysis is made of variations of oceanic circulation around Japan and of the various factors affecting such variations. Pt. 1 is a mathematical explanation of the non-stationary circulation attributed to the periodic variation of zonal wind stress. In Pt. 2, in the absence of sufficient velocity measurements, mean temperatures of the Kuroshio were taken as an indicator of the intensity of the current and used to estimate heat transport. In Pt. 3 the distribution of mass transport under coastal conditions is calculated by using Munk's fundamental equation and results are compared with observational data. In Pts. 4, 5 and 6 the effect of traveling disturbances in winter upon ocean circulation, and the appearance of cold water in the winter season are considered. In Pt. 7 the problem of analogy between ocean currents and the atmospheric jet stream is studied statistically. *Subject Headings:* **1. Oceanic circulation 2. Jet stream analogies 3. Ocean-atmosphere interaction 4. Oceanographic data 5. Kuroshio Current 6. Northwest Pacific.**—*M. P. Kramer, G.T.*

9F–19 551.46

Ichiye, Takashi (*Kobe Marine Obs.*), **Theory of oceanic turbulence.** *Oceanographical Magazine*, Tokyo, 3(3):83–87, Sept. **1951.** 3 figs., 7 refs., 4 eqs. **DWB**—Considering that large-scale horizontal turbulence in oceans is due to a variety of factors (wind variability, unstable wave generation in shear zone, coastal friction, orographic vortices, tidal currents and convective heating), turbulence spectra developed in other branches of science cannot be directly applied in oceanography. An approximate formula is developed for diffusion in oceans, in which a diffusivity factor increasing with distance is used rather than a constant factor. The formula was applied to the diffusion of drift bottles and calculated values showed reasonable agreement with observed ones. *Subject Heading:* **1. Oceanic turbulence theory.**—*G.T.*

9F–20 551.465:91.04

LaFond, E. C. et al., **Physical oceanography of the Bering and Chukchi Seas.** *Alaskan Science Conference, Wash., D. C., 1950. Proceedings.* Pub. **1951.** p. 80–81. **DWB**—The various oceanographic expeditions that have investigated the Bering and Chuckchee Seas since 1946 are listed. A brief description of the water flows in these seas is given. Suggestions for further research are made. *Subject Headings:* **1. Physical oceanography 2. Oceanographic expeditions 3. Bering Sea 4. Chuckchee Sea.**—*I.L.D.*

9F–21 551.556:551.465

Miami. University of (Coral Gables, Fla.). Marine Laboratory, **Florida current investigation.** Contract Nonr-193(00), Semi-annual progress report, Nov. 1, **1951.** 29 p. diagrs., graphs, tables. **DWB**—Investigations on the annual variations of average current velocity and monthly average wind stress in the direction of the Caribbean current are summarized, and evidence of the importance of the oceanic wind systems in the maintenance of the Gulf Stream is presented. The gradient of wind stress is analyzed in connection with MUNK's theory that the curl of wind stress is the predominating cause of the production of the existing pattern of mass transport streamlines. The

relationship between the average drift current and sea level difference Cat-Cay and Miami Beach the representativeness of sea level observations over a period of three years, variations in Atlanti wind velocity and the results of electromagnetic current measurements between Cat-Cay an Miami Beach are discussed. *Subject Headings:* **1. Florida Current 2. Ocean wind systems 3. Win effects 4. Ocean-atmosphere stress 5. Sea level variations 6. Gulf Stream. I. Smith, F. G Walton.**—*I.L.D.*

9F–22 551.556:551.551:551.4

Miyazaki, Masamori (*Kobe Marine Obs.*), **Averaged wind-stress relation on the sea surface** *Oceanographical Magazine*, Tokyo, 3(2):75–77, June **1951.** 2 figs., 6 refs. **DWB**—The followin average relation between wind velocity and tangential stress is developed:

$$u = \frac{u^*}{æ}\left\{\log z - 3.218 - \log \tau/\rho + 1.382\,(\tau/\rho)^{1/6}\right\},$$

where u = wind velocity, u^* = frictional velocity, $\sqrt{\tau/\rho}$, τ = tangential stress, ρ = density of wate $æ$ = universal turbulence constant 0.4, and z = height measured from the mean sea surface. Th formula is offered for cases in which the wave parameters are not known. If they are, the author more specific formula (developed in an earlier paper and repeated here) applies. *Subject Heading* **1. Tangential wind stress.**—*G.T.*

9F–23 551.4

*Nanniti, Tosiwo, **On the variation of the oceanographical condition along the so-called "C line (38°N, from 141°E to 153°E) from August 1948 to December 1949.** *Oceanographical Magazin* Tokyo, 3(1):27–48, March **1951.** 37 figs., 4 tables, 5 refs. **DWB**—Extensive data on water masse current velocity, water temperature and chlorinity measured along 38°N lat. are presented an discussed in detail. *Subject Headings:* **1. Oceanographic data 2. Northwest Pacific.**—*G.T.*

9F–24 551.556:551.46

Riley, Gordon A., **Parameters of turbulence in the sea.** *Journal of Marine Research*, 10(3):247 256, Dec. 31, **1951.** 2 figs., refs., 2 eqs. **DWB**—An equation for eddy diffusivity expressed in term of mean current speed, the distance between points of observation, the density of water and th dynamic molecular viscosity, is derived by means of dimensional analysis combined with statistica analysis data. This equation is applicable to vertical and horizontal diffusion in water of indifferen stability. The incorporation of a stability term makes the equation applicable to horizontal edd diffusion in stable water. The basic equation cannot be used satisfactorily for vertical diffusivit and conductivity in stable water. An empirical relationship of the vertical coefficients with mea current speed and stability is described and its physical meaning is discussed. It is concluded tha vertical diffusivity and conductivity in stable water differ fundamentally from other types of tur bulent exchange. *Subject Headings:* **1. Oceanic turbulence 2. Eddy diffusivity 3. Ocean curren speeds 4. Turbulent exchange.**—*From author's abstract.*

9F–25 551.46.018:551.46

Sauvage de Saint-Marc, G. and Boudan, M. (*both, Laboratoire Dauphinois d'Hydrauliqu Neyrpic*), **Mesure de salinité.** [Salinity measurement.] *La Houille Blanche*, Grenoble, v. Spec. No. A:263–267, May **1951.** 2 figs. English summary p. 217. **DLC**—An apparatus develope by the Laboratoire Dauphinois d'Hydraulique for salinity measurements over a wide range of sal content, as required by hydraulic engineers, is described and shown in a photo and its principles o operation explained and represented on diagrams. The instrument is based on electrolytic cor ductivity and compensation is made for variation in temperature. Calibration and control i discussed and it is pointed out that practical tests have proved the usefulness of the device, which at the time being, is suited for measurements down to depths of 100–150 m. *Subject Heading* **1. Salinity measurement 2. Salinity instruments.**—*G.T.*

9F–26 551.46

Schott, G., **Der Perustrom.** [The Peru Current.] *Erdkunde*, 5(4):316–319, Oct. **1951.** fig 6 refs. **DGS**—This conclusion to the work of E. Schweigger (*Erdkunde*, 3:121–132, 229–24 1949) discusses the catastrophic disturbances caused by El Niño, smaller local disturbances, and th mechanism of the Peru current proper. The latter is illustrated by a cross section in 16½°S up t 130 sea miles from coast and 300 m deep, showing upwelling water, isotherms and the vertical circula tion towards open Pacific, driven ultimately by S.E. Trade. *Subject Headings:* **1. Ocean current 2. Peru Current 3. Southeast Pacific Ocean.**—*C.E.P.B.*

9F–27 551.582.3(26)

*Schweigger, Erwin, **Atlas de la Corriente costanera peruana, parte primera.** [Atlas of the Peruvian coastal current, Pt. 1.] Lima, Peru, Compania Administradora del Guano, **1951.** 95 p. 34×39 cm. 37 tables, 29 maps, diagrs. **DWB** (M82.3/85 C737a). Pt. 1: 3°S to 12°S, 1938–1942. "Pt. 2 to cover 12°S to 18°S, 1938–1942, and Pt. 3 and 4 the same for 1943–1947." **DWB**—Included are tables, numerous charts, maps and wind roses representing 1938–1942 sea and air temp., wind direction and force and barometric pressure data as collected by commercial, government, and naval ships between 3°S and 12°S off the coast of Peru. This atlas, of which three more sections will appear, is an attempt to learn more about the environment of the economically vital guano birds through the study and analysis of consecutive years of detailed oceanographic and marine meteorological data. *Subject Headings:* **1. Marine atlases 2. Peru Current 3. Southeast Pacific. I. Compania Administradora del Guano, Ltd., Lima, Peru.**—*M. P. Kramer.*

9F–28 551.465(54)

Sewell, R. B. Seymour, **Oceanographic work in India.** *Science and Culture*, Calcutta, 17(4):145–147, Oct. **1951. DWB**—The significance to port and fishery officials in India of studies on tides, littoral drift, sea waves and analysis of the wave "spectrums," and of the characteristics and movements of water waves over the continental shelf is stressed. References to various recent studies on these subjects in English journals are cited. The work of some Indian oceanographers is described briefly. *Subject Headings:* **1. Oceanographic research 2. Ocean currents 3. Wave studies 4. India.**—*I.L.D.*

9F–29 551.556:551.465

Shtokman, V. B., **O nekotorykh ukorenivshikhsia zabluzhdeniiakh v fizicheskoĭ okeanografii.** [Some basic errors in physical oceanography.] *Priroda*, Moscow, 40(10):17–27, Oct. **1951.** 6 figs., 14 refs. **DLC**—The author criticizes the generally accepted opinions that the drift of the Gulf Stream at 30° lat. from the shores of North America and its northeast drift can be explained by the action of Coriolis force. Various explanations made by Russian authors on the basis of this assumption are presented and shown to be erroneous in terms of physical and dynamic facts. The role of the winds in producing the drift is stressed. Another erroneous opinion criticized by the author is that which explains by the Coriolis force the drift of the Atlantic current which enters the polar basin. *Subject Headings:* **1. Physical oceanography 2. Gulf Stream drift 3. Coriolis force 4. Wind effects.**—*I.L.D.*

9F–30 551.46

†Stone, Jack Leslie, **Acoustic wave propagation through inhomogeneous media: bibliography.** Princeton Univ. Dept. of Electrical Engineering, Contract N6onr-270, T.O. 5, Technical Report No. 7, Aug. **1951.** 17 p. 107 refs. **DLC**—A selective, unannotated bibliography of over 100 items compiled primarily "for use in future theoretical investigations of the propagation of sound in the sea." Numerous references pertaining to wave fields are included as aids to the solution of acoustic problems. An explanatory text accompanies the bibliography. *Subject Headings:* **1. Submarine acoustics 2. Bibliographies.**

9F–31 551.465(266)

Thompson, Thomas G. and Barnes, Clifford A., **Physical and chemical oceanography of the Gulf of Alaska and the Aleutian Islands.** *Alaskan Science Conference, Wash., D. C., 1950, Proceedings.* Pub. **1951.** p. 82.—Current movement, current measurements, seasonal range of temperature and O_2 distribution in water are discussed. *Subject Headings:* **1. Currents 2. Sea temperatures 3. O_2 in sea water 4. Gulf of Alaska 5. Aleutian Islands.**—*I.L.D.*

9F–32 551.465

Watson, Edmunde E., **The Gulf Stream.** *Weather*, 6(11):323–327, Nov. **1951. DWB.** Repr. from *Queen's Quarterly*, 57(1), 1950.—A chatty account of the history, causes and structure of the Gulf Stream system. *Subject Headings:* **1. Ocean currents 2. Gulf Stream.**—*C.E.P.B.*

9F–33 551.577:551.573(26):551.49

†Wüst, Georg (*Kiel*), **Die Kreisläufe des Wassers auf der Erde.** [The hydrologic cycle of the earth.] *Naturwissenschaftlicher Verein für Schleswig-Holstein, Schriften*, 25:185–195, **1951.** 6 figs., 28 refs. Abstracted from reprint. **DWB**—A summary of recent contributions regarding the hydrologic cycle over the oceans, especially the author's salinity method and Albrecht's water balance charts. A block diagram and a map of bottom temperatures characterize the great oceanic deep water circulation, which extends over both hemispheres. The bibliography is limited to German works. *Subject Headings:* **1. Hydrologic cycle 2. Water balance of oceans 3. Oceanic circulation 4. Atlantic Ocean.**—*A.A.*

1952

9F–34 532.593:551.46

Arthur, Robert Siple; Munk, Walter H. and Isaacs, John D. (*Scripps Inst. of Oceanography*) **The direct construction of wave rays.** *American Geophysical Union, Transactions*, 33(6):855–86 Dec. **1952.** 8 figs., 2 tables, 10 refs., 12 eqs. **DLC**—In the construction of refraction diagrams fo ocean waves, the rays (orthogonals) can be drawn more accurately if the approximate formul $\Delta\alpha = (\Delta L/L_{ave}) \tan \alpha$, used by JOHNSON, O'BRIEN, and ISAACS [1948] in the preparation of refractio protractors, is replaced by $\Delta\alpha = \sin^{-1}[(1+\Delta L/L)\sin\alpha] - \alpha$. In these formulas, α is the angle bo tween wave crest and depth contour, and L the wave length taken at the beginning of any contou interval; $\Delta\alpha$ and ΔL are the corresponding changes over the contour interval. A modified procedur for the construction of rays is presented. *Subject Heading:* **1. Wave motion.**—*Author's abstract.*

9F–35 551.46

Chase, Joseph, **A comparison of certain wind, tide gauge and current data.** Woods Hol Oceanographic Institution, Contract N6onr-27701 (NR-083-004), Technical Report (unnumbered) Sept. **1952.** 10 p. 6 figs. **DWB**—Author compares winds (from mean weather maps) and tid gage readings (from Charleston, Bermuda, Miami, Cat Cay and Galveston) in both long and shor period averages in the hope of shedding further light on the value of such data as a key to the fluctua tion of ocean current transport. Good agreement found between trade winds and currents in long time monthly averages, fair agreement in short-time averages. Not much difference in agreemen when "trades plus westerlies" are used. Correlation between wind and tide gage data is good Peaks and troughs of the transport curve tend to lag 1–3 months behind those of the tide gage an wind curves. More data needed for conclusive evidence. *Subject Headings:* **1. Ocean curren transport 2. Tide gage data 3. Ocean current theory 4. Gulf Stream.**—*M. P. Kramer.*

9F–36 551.465:551.526.

Hanzawa, Masao (*Central Met. Obs., Oceanographic Sec.*), **On some examples of abrupt change of oceanographical conditions at the Ocean Weather Station 'Extra' adjacent to the oceanic polar front.** *Oceanographical Magazine*, Tokyo, 4(3):67–79, Dec. **1952.** 14 figs., 8 refs. **DLC**—Data on 3 cases of sudden invasions of warm or cold water observed at the Japanese weather ship "Extra" (39°N, 153°E, 1949–1951) are presented and discussed in connection with the winds prevailing at the time. It appears that winds considerably contribute to the advection of cold or warm water *Subject Headings:* **1. Oceanic polar front 2. Oceanic advection 3. Wind effects on ocean tempera ture.**—*G.T.*

9F–37 551.465:551.556

Hidaka, Koji (*Tokyo Univ.*), **Circulation in a zonal ocean induced by a planetary wind system** *Oceanographical Society of Japan, Journal*, 8(1):7–13, July **1952.** 2 figs., 3 refs., 20 eqs. **DWB**— Mathematical treatment of the wind-induced circulation in an idealized zonal ocean bounded by two latitude circles on a rotating globe. Starting from the equations of mass transport in ocean currents, the author derives an equation which gives the relation between the wind stress and pressure in the ocean for the case where the southern and northern coasts are situated symmetrically with respect to the equator. He then computes mass transport for the planetary wind belts actually prevailing. Lastly he determines theoretical values for meridional slope of the sea surface and for the coefficient of lateral mixing. *Subject Headings:* **1. Wind stress 2. Ocean current theory 3. Wind driven currents.**—*M. P. Kramer.*

9F–38 551.465:525.6

Ichiye, Takashi (*Kobe Marine Obs.*), **On the variation of oceanographical elements due to the tidal currents.** *Oceanographical Magazine*, Tokyo, 4(3):81–88, Dec. **1952.** 3 figs., 2 tables, 4 refs., 3 eqs. **DLC**—Results of a harmonic analysis of mean tidal currents at two stations south and east of Awaji, Japan, show close agreement with temperature and chlorinity variations at the same stations. The paper includes theoretical considerations concerning the roles of advection, diffusion and turbulent mixing in the mechanism of tidal flushing. *Subject Heading:* **1. Tidal flushing.**—*G.T.*

9F–39 551.556:532.593:551.46

Ichiye, Takashi (*Kobe Marine Obs.*), **A short note on energy transfer from wind to waves and currents.** *Oceanographical Magazine*, Tokyo, 4(3):89–93, Dec. **1952.** fig., 4 refs. **DWB**—A qualitative analysis of energy transfer from wind is made by means of theoretical energy spectra of waves and drift currents. A relation developed for early stages of drift currents and later stages of wave growth shows that the turbulent energy of the surface layer is supplied by wave action. *Subject Heading:* **1. Wind-wave energy exchange.**—*G.T.*

9F–40 551.556:551.465

Kajiura, K. (*Geophys. Inst., Tokyo Univ.*), **The velocity distribution of wind currents in the eastern part of the equatorial Pacific.** *Oceanographical Society of Japan, Journal*, 8(1):15–22, July **1952.** 3 figs., 6 refs., 13 eqs. **DWB**—Wind driven currents in a baroclinic ocean are discussed following the ideas of SVERDRUP and REID, and the current velocities in the upper layers of the eastern equatorial Pacific are calculated on the assumption that the inertial forces and the lateral friction are negligible. According to the present theory, currents may be divided into two parts, of which one is the pure drift current and the other is the relative current, and it is found that the results are in good agreement with the present knowledge of the currents near the equator. In these regions, the relative currents are much stronger than the pure drift currents and the north-south component of the velocity is very small compared with the E-W component. *Subject Headings:* **1. Current velocity distribution 2. Wind driven currents 3. East Equatorial Pacific.**—*Author's abstract.*

9F–41 532.59:551.465

†Keulegan, G. H. (*U. S. Bureau of Standards, Nat. Hydraulic Lab.*), **Wave motion.** (In: **Engineering hydraulics,** ed. by Hunter Rouse. N. Y., John Wiley, **1950.** p. 711–768. 32 figs., table, 31 refs., 82 eqs.) **DWB**—Basic information on the theory of shallow and deep water waves, transformation of waves, open-channel surges and internal or interfacial waves, their stability and density currents. *Subject Headings:* **1. Wave motion 2. Water waves 3. Deep water waves.**—*A.A.*

9F–42 532.59:551.465

Kierstead, Henry A., **Bottom pressure fluctuations due to standing waves in a deep, two-layer ocean.** *American Geophysical Union, Transactions*, 33(3):390–396, June **1952.** fig., 3 refs., 52 eqs. **DLC**—The pressure fluctuations in a deep ocean, due to short-period surface waves, is calculated by means of a simple physical model. It is shown, as was pointed out earlier by LONGUET-HIGGINS, that the pressure under a standing wave varies at twice the frequency of the wave and with an amplitude proportional to the square of the wave amplitude, and inversely proportional to the wave length, but that the pressure under a progressive wave is constant. A similar calculation of the pressure fluctuation under a standing internal wave gives similar results, but the amplitude is diminished by the factor $(\Delta\rho/\rho)$. Numerical calculations, using typical wave amplitudes, show that pressure fluctuations of about 30 cm may occasionally be expected under six-second surface waves, but that internal waves, because of their large wave lengths, will have little effect on the pressure in the deep ocean. *Subject Headings:* **1. Bottom pressure fluctuations 2. Wave mechanics 3. Ocean waves.**—*Author's abstract.*

9F–43 551.501:551.526.6

Kirk, T. H., and Gordon, A. H., **Comparison of intake and bucket methods for measuring sea temperature.** *Marine Observer*, 22(155):33–39, Jan. **1952.** 2 figs., 3 tables. **DWB**—Comparisons of intake and bucket temperatures in Netherlands data show the former about 1°F higher than the latter. At British Ocean Weather Ships the difference averages 0.2°F under way (not significant) and 0.4°F stationary. Differences attributed mainly to loss of heat from bucket, partly to transfer of heat from engine room to intake pipe. *Subject Heading:* **1. Sea temperature measurement techniques.**—*C.E.P.B.*

9F–44 551.508.29:551.526.6

Mani, Anna (*Met. Office, Poona*), **A bucket for the measurement of sea surface temperature.** *Indian Journal of Meteorology and Geophysics*, 3(4):278–280, Oct. **1952.** 4 figs., refs. **DWB**—Sketch and description of rubber bucket. Accuracy of measurement ± 0.1°F, if bucket is tossed in the sea for one minute and an accurate thermometer of quick response and small heat capacity is used. *Subject Heading:* **1. Sea temperature measurement techniques.**—*A.A.*

9F–45 551.524.4:551.526.64(265/266)

Masuzawa, Jotaro (*Oceanog. Sec., C.M.O., Tokyo*), **On the heat exchange between sea and atmosphere in the Southern Sea of Japan.** *Oceanographical Magazine*, Tokyo, 4(2):49–55, Oct. **1952.** 3 figs., table, refs.—An attempt to estimate the heat budget of the ocean at the Southern Fixed Point (135°E, 29°N) about 300 mi south of Japan, using meteorological and oceanographical observations of the Central Meteorological Observatory. Radiation heat absorbed by sea water evaporation from the sea, conduction of sensible heat from the sea surface, heat transport of ocean currents and seasonal variation of heat exchange briefly considered. *Subject Headings:* **1. Energy exchange sea-atmosphere 2. Heat exchange 3. North Pacific.**—*M. P. Kramer.*

9F–46 551.465:551.55

Miyazaki, Masamori (*Kobe Marine Obs.*), **Notes on the theory of the wind-driven oceani circulation.** *Oceanographical Magazine*, Tokyo, 4(2):31–36, Oct. **1952.** 3 figs., refs., 11 eqs. **DWB DLC**—The wind stress exerted on the ocean surface is assumed to have a gyral structure, resultin in smaller values of the lateral mixing coefficient in coastal regions than offshore. Chief purpose o this paper is to calculate the distribution of mass transport under these circumstances using MUNK' fundamental equation. These conditions made possible the adjustment of the absolute quantitie of mass transport to the observed data and the explanation of counter currents near the westerr edge of the ocean. *Subject Headings:* **1. Wind current theory 2. Wind driven ocean circulatio 3. Water mass transport.**—*From author's abstract.*

9F–47 551.511.6:551.4

Nanniti, Tosiwo, **On the austausch coefficient in the sea.** *Oceanographical Magazine*, Tokyo 3(1):49–52, March **1952.** 2 figs., 3 tables, 3 refs. **DWB**—An empirical formula for austausch coefficient for the region of the Kuroshio Current is derived from observed temperature and chlorinity distributions. *Subject Headings:* **1. Austausch coefficient in sea 2. Kuroshio Current.**—*G.T.*

9F–48 551.552(266):551.556:551.46

Nanniti, Tosiwo (*Met. Res. Institute, Tokyo*), **On the fluctuation of the Kurosiwo and the wind** *Oceanographical Society of Japan, Journal*, 8(1):23–29, July **1952.** fig., tables, 7 refs. **DWB**— Using W. H. MUNK's wind-driven circulation theory, author determined the intensity of the Kuroshi by calculating shearing stresses of wind between two weather IGY stations such as Isigakizima Minamidaito, Minamidaito-Nase, Yakuzima-Kagosima, Koti-Asizuri and Wakkanai-Sapporo *Subject Headings:* **1. Wind driven currents 2. Wind stress 3. Kuroshio Current 4. Northwes Pacific Ocean 5. Japan.**—*From author's abstract.*

9F–49 551.556:551.4

Texas. Agricultural and Mechanical College. Dept. of Oceanography, **Study of transfe processes operating at the ocean boundaries.** Contract N7onr-487, Task Order 4, Project NR 084 004, Project 30, Annual report for the period ending March 14, 1952. Pub. April 15, **1952.** 17 p 14 figs. (some folded). **DWB**—A summary of progress during the first year on the Texas A. and M project aimed at detailed oceanographic research in the Gulf of Mexico. Instrumentation on ar offshore oil platform for "continuous measurements of temp. at twelve different levels in the air water and sediment, wind speed at four levels, wind direction at one level, atmos. pressure, relative humidity, precip., evaporation, solar radiation, salinity at two depths, water level, and surface waves" is described. Some results are presented in graphic form. *Subject Headings:* **1. Ocean atmosphere interaction 2. Gulf of Mexico. I. Reid, Robert O. II. Clayton, William H.**—*M.P. Kramer.*

9F–50 551.46:91.04

Vercelli, F., **Conseil International pour l'Exploration de la Mer. (Amsterdam 1–9 ottobre 1951)** [International Council for the Exploration of Sea, Amsterdam Oct. 1–9, 1951.] *La Ricerca Scientifica*, 22(1):81–84, Jan. **1952. DLC**—Report contains section outlining hydrographic research, and activities of the Hydrographic Committee under H. U. SVERDRUP including report of work of Danish Norwegian, English and French oceanographic cruises or expeditions. *Subject Headings:* **1. Ocean ographic expedition reports 2. Hydrographic research. I. Sverdrup, H. U.**—*M.R.*

1953

9F–51 551.46.018:551.508.29:551.52

Agari, S., **On the trial manufacture of remote sea-depth and -temperature indicator.** *Journa of Meteorological Research*, Tokyo, 5(5):409–421, June **1953.** 15 figs., 2 tables, 14 eqs. In Japanese English summary p. 409. **DWB**—A remote sea-depth and -temperature indicator utilizing protected and nonprotected mercurial thermometers with sealed carbon filaments was manufactured and tested down to 20 m sea depth in the Bay of Tokyo. The results are reported to have quite outstanding features of easy handling and reasonable accuracy of 0.1°C for temperature and 1 m for sea depth. The lag coefficient is smaller than for an ordinary thermometer and satisfactory for the proposed purpose. The problem is also treated theoretically assuming linear and sinusoidal change of ambient temperature. On the whole the instrument can be concluded to be far more practical in continuous observation than the bathythermograph, while accuracies of both instruments are comparable. *Subject Headings:* **1. Oceanographic instruments 2. Water temperature instruments 3. Tokyo Bay** —*Author's abstract.*

9F–52 551.556:551.465:532.59

Bowden, K. F., **Note on wind drift in a channel in the presence of tidal currents.** *Royal Society of London, Proceedings, Ser. A*, 219(1139):426–446, Oct. 7, **1953.** 9 figs., 5 tables, 16 refs., 65 eqs. **DLC**—A theoretical discussion of wind drift as a small perturbation of strong tidal currents normal in British waters. It assumes a skin-friction layer close to the bottom and eddy viscosity constant with depth above it. Taking best available values for wind stress on surface, bottom stress and eddy viscosity, numerical calculations are made for various shapes of channel. In one representing the English Channel, zero surface gradient along the Channel best fits observed flow through Straits of Dover. *Subject Heading:* **1. Wind driven currents.**—*C.E.P.B.*

9F–53 551.556:551.465 (265/266)

Cromwell, Townsend (*Pacific Oceanic Fishery Investigations, U. S. Fish & Wildlife Service*), **Circulation in a meridional plane in the Central Equatorial Pacific.** *Journal of Marine Research*, 12(2):196–213, Dec. 1, **1953.** 9 figs., refs. **DLC**—Meridional sections of salinity, inorganic phosphate, and dissolved oxygen, based on new data from the central equatorial Pacific, show evidences of upwelling near the equator. An Equatorial Front in the ocean surface layer is described. Sinking occurs along this front, which is found most often just north of the equator. Reasons are advanced for the existence of horizontal convergence and sinking in a region slightly to the north of the equator during southeast tradewinds when no front is present. Horizontal divergence and convergence apparent in a qualitative model of horizontal flow near the equator seem to be important in producing vertical motion. The circulation in a meridional plane in the surface layer is discussed, with strict adherence to the principles of isentropic analysis. The role played by the circulation in supporting a large population of zooplankton and fishes is discussed. *Subject Headings:* **1. Ocean currents 2. Wind-driven currents 3. Central Equatorial Pacific.**—*Author's abstract.*

9F–54 551.510.42:551.465

Currie, Ronald, **The Callao Painter.** *Weather*, 8(10):308–311, Oct. **1953.** 2 photos, 8 refs. **MH-BH**—Account of results of upwelling water in Peru Current, including rich plankton, and effect of incursions of El Niño in killing fish and releasing hydrogen sulphide formed on sea bed by bacteria. Similar eruptions of sulfurous fumes off S.W. Africa are also described. *Subject Headings:* **1. Atmospheric pollution 2. Callao Painter 3. Peru Current.**—*C.E.P.B.*

9F–55 532.59:551.46

Dmitriev, A. A., **Prokhozhdenie dlinnykh voln cherez prepiatsviia pri chastichnom otrazhenii s zadannym koeffitsientom otrazheniia.** [The passage of long waves over obstacles in the case of partial reflection with a given coefficient of reflection.] *Akademiia Nauk SSSR, Doklady*, 90(4):509–512, June 1, **1953.** table, 20 eqs. **DLC**—This problem is of interest to the analysis of the passage of long ocean waves over underwater ridges and in narrow channels and possible for certain atmospheric phenomena. The coefficient of reflection is in the first approximation proportional to the cross section rates in the channel and is assumed given. Equations are developed for reflection from a single obstacle and from two obstacles at a distance L and 2L from the beginning of the coordinates. *Subject Heading:* **1. Ocean wave refraction.**—*I.L.D.*

9F–56 551.556:551.46

*Franceschini, Guy A., **Distribution of the mean monthly wind stress over the Gulf of Mexico.** Texas. Agricultural and Mechanical College, Dept. of Oceanography, Contract AF 19(604)-169, Scientific Report No. 1, Aug. **1953.** 19 p. 14 figs., table, refs., eqs. **DWB**—The areal distribution of the mean monthly and annual wind stress on the Gulf of Mexico is presented. Approximate values of the stress were determined for each 2° latitude-longitude quadrangle using mean monthly wind tabulations of ship observations. Calculations were based on the assumption that wind stress is proportional to the square of the wind speed. Prominent features of the stress distribution are noted. Qualitative agreement, according to classical theory, of this distribution with observed mean surface currents in the western half of the Gulf is indicated. A brief discussion of the association in this area between mean surface flow and the mean pattern of surface water temperature is included. *Subject Headings:* **1. Wind stress distribution 2. Gulf of Mexico.**—*Author's abstract.*

9F–57 551.526.6:551.556

Francis, J. R. D. and Stommel, H., **How much does a gale mix the surface layers of the ocean?** *Royal Meteorological Society, Quarterly Journal*, 79(342):534–536, Oct. **1953.** table, 3 refs. **DWB**—Bathythermograph records 0–300 ft from weather ships in N. Atlantic are tabulated for 15 periods of at least 2 days with Beaufort force below 4 followed by at least one day of force 8 or more. It is found that a single day deepens mixed surface layer by 20–30 ft. *Subject Headings:* **1. Sea temperatures 2. Wind effects 3. North Atlantic.**—*C.E.P.B.*

9F–58 551.465:551.582.1(85

García Méndez, Carlos A., **La corrienta maritima del Peru y su replica en el clima de su litora durante el año de 1951.** [The Peruvian ocean current and its effect on the coastal climate durin 1951.] *Sociedad Geográfica de Lima, Boletín*, 70(3/4):87–89, **1953.** 2 graphs, 6 refs. **DWB**— Discussion of the variation in location and intensity of upwelling (associated with southerly wind along the Peruvian coast) and resultant effects on the coastal climate and economy in 1951 (heav rains, floods, high mortality of quano birds, stratus clouds). Graphs show evidence of distinc zones of upwelling in one season which disappeared in some cases in another season. Author suggest that the migration and disappearance of the zones of upwelling are characteristics of the Peru coasta current and that their study is the key to understanding the coastal climate. *Subject Headings* **1. Peru Current 2. Upwelling 3. Climate of Peru 4. Eastern South Pacific.**—*M.P.K.*

9F–59 551.465:91.0

Jerlov, N. G. (*Fishery Board of Sweden, Gothenburg*), **Studies of the equatorial currents in th Pacific.** *Tellus*, Stockholm, 5(3):308–314, Aug. **1953.** 9 figs., 10 refs. **DLC**—Some dynami results have been derived from oceanographic data collected in the equatorial currents in the Pacifi Ocean during the Swedish Deep Sea Expedition. Horizontal current velocities geostrophically computed for three meridional sections bring out some characteristic features in the flow distributio within the Countercurrent. A survey of the mass transport of water from surface to 500 m depth reveals a slow eastward flow at 12°–15°N. The reality of this weak additional countercurrent is however, not clearly established. *Subject Headings:* **1. Equatorial ocean currents 2. "Albatross" (Swedish Deep Sea) Expedition, 1947–48 3. Oceanographic expeditions 4. Pacific Ocean.**— *Author's abstract.*

9F–60 551.524.4:551.526.64(261

*Jung, Glenn Harold and Gilcrest, Robert Allen, **Heat budget of a water column, autumn, North Atlantic Ocean.** Texas. Agricultural and Mechanical College. Dept. of Oceanography, Contrac N7onr-48703, Project NR 983-061, Project 29, Technical Report No. 4, Aug. **1953.** 59+17 p 9 tables, 19 figs., bibliog. p. 58–59, eqs. **DWB**—Using recent ocean weather ship data an attempt is made to work out a comprehensive heat budget (North Atlantic Weather Ship "C" for 1947, 1948 and 1949). Jacobs formula for evaporation is tested against the Lake Hefner (Oklahoma) formula and found to give results about 1.5 to 2.4 times as great on a number of occasions (average 2.2) It was found more suitable to oceanic conditions since it differentiates smooth (<6.5 m/sec) from rough (>6.5 m/sec) winds and is based on environmental conditions more analogous to the Weather Ship Stations than the Lake Hefner model. Solar and back radiation are also considered. Advection is considered the cause of the lack of balance. *Subject Heading:* **1. Energy exchange sea-atmosphere 2. Oceanic heat budget 3. North Atlantic Weather Ship "S" 4. North Atlantic.**—*M.R.*

9F–61 551.526.6(261)

Kirk, T. H., **Seasonal change of surface temperature of the North Atlantic Ocean.** *Great Britain. Meteorological Office, Geophysical Memoirs*, 11(90); **1953.** 36 p. 12 figs., tables, 5 refs At head of title: M.O. 530e. **DWB**—Sea surface temperature data for 1° or 2° squares were analyzed for annual harmonic series $T = a_0 + a_1 \sin(t + A_1) + a_2 \sin(2t + A_2)$. Charts show distribution of a_0, a_1, a_2, $100a_2/a_1$, A_1, A_2, $\frac{1}{2}(2A_1 - A_2 - 90)$, and for each month $\partial T/\partial t$. The results are discussed in relation to solar radiation on a horizontal surface, heat exchange between ocean and atmosphere and vertical and horizontal heat transport in the ocean. *Subject Headings:* **1. Sea surface temperature variations 2. North Atlantic.**—*C.E.P.B.*

9F–62 532.5:551.465

Kitkin, P. A., **O dinamike morskikh i okeanicheskikh techenii.** [Dynamics of sea and ocean currents.] *Akademiia Nauk SSSR, Doklady*, 92(2):293–296, Sept. 11, **1953.** 9 eqs. **DLC**—From the Eulerian equations the author derives a system of equations expressing the movement of ocean currents which differs from the Navier-Stokes equations for the movement of a viscous fluid by the absence of the symmetry tension of strain. The simplified system of hydrodynamic equations of oceanic flow are:

$$\frac{du}{dt} - 2\Omega_3 v + \frac{1}{\rho}\frac{dp}{dx} = A_L\left(\frac{\partial^2 u}{dx^2} + \frac{\partial^2 u}{dy^2}\right) + \frac{d}{dz}\left(A_H \frac{\partial u}{\partial z}\right)$$

$$\frac{\partial v}{dt} + 2\Omega_3 u + \frac{1}{\rho}\frac{dp}{dy} = A_L\left(\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 v}{\partial y^2}\right) + \frac{\partial}{\partial z}\left(A_H \frac{\partial v}{\partial z}\right)$$

$$\frac{\partial p}{dt} + wE = 0, \quad \frac{1}{\rho}\frac{\partial p}{dz} = g; \quad \frac{\partial u}{\partial x} + \frac{\partial v}{\partial y} + \frac{\partial w}{\partial z} = 0. \quad E = \frac{1}{o\rho}\frac{\partial p}{\partial z}.$$

Subject Headings: **1. Ocean currents 2. Hydrodynamics.**—*I.L.D.*

9F–63 551.556:551.465

Kitkin, P. A., **O tsirkuliatsii, vozbuzhdaemoĭ vetrom v more peremennoĭ plotnosti.** [Circulation caused by wind in a sea with variable density.] *Akademiia Nauk SSSR, Izvestiia, Ser. Geofiz.*, No. 3:232–251, **1953.** 7 figs., 8 tables, 3 refs., 4 eqs. **DLC**—Development of a wind induced current in a mass of water with increasing density contained in a circular reservoir is theoretically examined. As the simplest example, the case with an established wind circulation, maintained by cyclonic wind system, is mathematically analyzed. Practical calculations of an established, wind induced current are given in great detail as well as calculations of development of a wind current in a stratified (by density) sea. *Subject Headings:* **1. Wind driven currents 2. Experimental oceanography.**—*N.T. Zikeev.*

9F–64 551.556:551.465:551.311.17

Ommanney, F. D., **The ocean stream, pt. 1, The Antarctic Ocean.** *Geographical Magazine*, 26(3):158–165, July **1953.** 3 figs., 8 photos. **DWB**—Popular account of wind driven surface currents and vertical oceanic circulation around the Antarctic continent. *Subject Headings:* **1. Ocean currents 2. Southern Ocean.**—*C.E.P.B.*

9F–65 532.59

Santon, L. and Marcou, C., **Enregistrement graphique du profil d'une houle produite en laboratoire.** [Graphical recording of the profile of a wave produced in a laboratory.] *La Houille Blanche*, 8(3):411–417, June/July **1953.** 5 figs. English text p. 415–417. **DLC**—Periods of immersion and emersion of a point-gage are electrically detected and recorded on a cylinder. The simple apparatus is extremely sensitive to the form of the wave profile and its phase, but is less precise for the amplitudes. Photos of the equipment and sample records are shown. *Subject Headings:* **1. Wave recording 2. Laboratory experiments.**—*A.A.*

9F–66 551.508.29:771

Schamiel, Carl L., Jr. (*U. S. Navy Electronics Lab., San Diego, Calif.*), **A camera for photographic bathythermograph slides.** *Journal of Marine Research*, 12(3):277–279, Dec. 31, **1953.** fig. **DLC**—Portable camera is described and illustrated. It is a modification of cameras used at Woods Hole and elsewhere. *Subject Headings:* **1. Bathythermographs 2. Photographic equipment.**—*M.R.*

9F–67 532.593

Shand, J. A. (*Defence Res. Board of Canada, Victoria, British Columbia*), **Internal waves in Georgia Strait.** *American Geophysical Union, Transactions*, 34(6):849–856, Dec. **1953.** 6 figs., 4 refs. **DLC**—Various types of waves shown on aerial photographs of the water surface of Georgia Strait are explained on the basis of probable origin. Normal wind waves are present but are not the subject of the analysis. Long waves (about 3000 ft apart) are explained as internal waves with a character determined by coastal configuration and convergence of water masses. The tide in this strait is about 16 ft. *Subject Headings:* **1. Internal waves 2. Wind waves 3. Strait of Georgia, British Columbia.**—*M.R.*

9F–68 551.46:532.593:551.556

Shuleĭkin, V. V., **Gidrodinamicheskaia kartina peredachi energii ot vetra volne.** [Hydrodynamic picture of energy transfer from wind to the waves.] *Akademiia Nauk SSSR, Doklady*, 92(1):41–44, Sept. 1, **1953.** ref., 20 eqs. **DLC**—Using hydrodynamic equations, the author attempts to prove a previously enunciated physical hypothesis of the transmission of wind energy to waves (*Ibid.*, 91(5), 1953). In this hypothesis it is maintained that the pressure on a free surface falls by a perceptible magnitude (σ) on the crest of a wave and rises in the trough. And it is shown that variation of atmospheric pressure upon a fall surface of water having an amplitude σ causes an increase in height of wave ($h = 2r_0$) corresponding to this hypothesis. *Subject Heading:* **1. Wind-wave energy transfer.**—*I.L.D.*

9F–69 551.46

Stommel, Henry; von Arx, W. S.; Parson, D. and Richardson, W. S., (*all, Woods Hole Oceanog. Inst., Mass.*), **Rapid aerial survey of Gulf Stream with camera and radiation thermometer.** *Science*, 117(3049):639–640, June 5, **1953.** 4 refs. **DLC**—Experimental flight made using a Goylay infrared detector in order to find the locations of sharp discontinuities of sea surface temperature. The flight was a complete success providing an almost synoptic oceanographic chart of surface thermal gradients for a large ocean area. *Subject Headings:* **1. Aerial oceanographic surveys 2. Sea surface discontinuities 3. Gulf Stream.**—*A.A.*

9F–70 532.59

Taylor, Sir Geoffrey, **An experimental study of standing waves.** *Royal Society of London, Proceedings, Ser. A*, 218(1132):44–59, June 9, **1953.** 21 figs., 2 tables, 2 refs., 6 eqs. **DLC**—Ex-

periments in a tank at Cavendish Laboratory, Cambridge, Eng., confirmed theoretical results of W. G. Penney and A. T. Price on wave profiles. Crests of standing waves become pointed at a height of 0.15 wave length, and become unstable at greater heights. Illustrated by numerous photos. *Subject Heading:* **1. Wave mechanics.**—*C.E.P.B.*

9F–71 551.524.4:551.526.6

Texas. Agricultural and Mechanical College. Dept. of Oceanography, **Atmospheric influence on the thermal structure of the oceans.** Contract N7onr-48703, Project NR 083-061, Project 29 Progress Report, April 1, 1952–May 31, 1953; Second Annual Report, July **1953.** 25 p. 2 figs. table, eqs. **DWB**—Bathythermograph data obtained in the Atlantic and Pacific during a two month period by Woods Hole and Scripps during Weather Ship cruises, have been selected and processed for future study in connection with meteorological data. Relation between wind, stability and changes in mixed layer depth was studied for Weather Ship Station C (52°45′N, 35°30′W) in Atlantic by studying effect of wind force and air-sea temp. difference on stability of sea. Evaporation was also calculated using W. C. Jacobs' formula, employing 3-hourly observations of air-sea surface temp., wind speed and direction. Heat budget for several years was also calculated week by week and summarized. Advection was found to be important in heat budget. *Subject Headings:* **1. Energy-exchange sea-atmosphere 2. Weather Ship Station C. I. Kahan, Archie Marion.**—*M.R.*

9F–72 551.465

Wagner, Lansing P. and Chew, Frank, **Some results of the Florida Current survey, Nov. 15 1952 to May 15, 1953.** Miami, Univ. of (Coral Gables, Fla.). Marine Lab., Contract Nonr-840 (01) Technical Report (unnumbered), June 1, **1953.** 53 p. 31 figs., 4 tables, 6 refs., 3 photos. **DWB**—Discussion and graphic representation of results of temperature and current measurements as related to tides and internal waves. Velocity structure was studied through use of a geomagnetic electrokinetograph (GEK). Transport determinations attempted by means of the Malkus-Stern theory show a strong relation between transport and the cross-sectional area above the first strong thermocline. *Subject Headings:* **1. Florida Current 2. Ocean current surveys 3. Water mass transport.**—*A.A.*

9F–73 551.46:551.556

Wilson, Basil W. (*Texas A. and M. College*), **Measurement of wave heights in the model of Table Bay Harbour.** *Engineering*, London, 176:245–247, 266–267, Aug. 21, 28, **1953.** 11 figs. table, 4 eqs. **DLC.** Reprinted in *Texas Agri. and Mechanical College. Dept. of Oceanography & Meteorology, Contributions in Oceanography and Meteorology*, 2(31/59):305–313, **1954/1956. DWB**—A model of Cape Town harbor, as illustrated, occupies most of a room 40′×50′ and is 20″ deep, and is on a horizontal scale of 1–120° and a vertical scale of 1–144. The bed is sand and mortar. A seichometer was devised to try to reproduce the phenomenon known as "range" or surge resulting from resonance within the harbor basin. It sometimes results in severe and prolonged motions of even large ships moored. A "kymatograph" or battery of wave manometers was installed so that the various motions could be recorded. The instrument and equipment is described and records reproduced and analyzed, and resulting predictions illustrated to show degree of conformity, best at highest and lowest frequency. *Subject Headings:* **1. Wave propagation models 2. Kymatograph analysis 3. Table Bay, Cape Town, South Africa.**—*M.R.*

9F–74 551.465

Wyrtki, Klaus, **Die Dynamik der Wasserbewegungen im Fehmarnbelt I.** [The dynamics of water motion in the Fehmarn Belt.] *Kieler Meeresforschungen*, Kiel, 9(2):155–170, **1953.** 13 figs. bibliog. p. 170, eqs. **DWB**—Vertical cross section of salinity, temperature, and currents and diagrams indicating wind and air pressure conditions serve to illustrate a discussion of the dynamics of water oscillations in the Fehmarn Belt (straits between Germany and Denmark) in which currents are computed by the Bjerknes theory and also taking into consideration wind stress. *Subject Headings:* **1. Ocean currents 2. Tidal oscillations 3. Wind stress 4. Fehmarn Belt.**—*M. P. Kramer.*

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9F–75 551.465(27)(264)

Clowes, A. J., **Inshore surface currents on the west coast of the Union of South Africa.** *Nature*, London, 173(4412):1003–1004, May 22, **1954.** fig., 2 refs. **DLC**—Out of 4040 cards in plastic envelopes released in the Benguela current 2½% were found on shore. This shows occasional presence of currents setting inshore. *Subject Headings:* **1. Ocean currents 2. Benguela Current 3. South Atlantic.**—*C.E.P.B.*

9F–76 551.465

Darbyshire, J., **Wave conditions in the North Atlantic, 1953–54.** *Nature*, London, 174(4435): 827–828, Oct. 30, **1954.** fig., 2 tables, 2 refs. **DWB**—Waves recorded by O.W.S. "Weather Explorer" in N. Atlantic are summarized statistically for frequency of maximum wave height and wave period. Results are shown in figures and tables for each month. Waves are much higher in open ocean than at Perranporth, Cornwall, but periods are shorter, due to greater energy in waves of short period. *Subject Headings:* **1. Wave data 2. North Atlantic.**—*C.E.P.B.*

9F–77 551.465:551.556

Freeman, John C., Jr., **Note on a prediction equation for the surface layer of a two-layer ocean.** *American Geophysical Union, Transactions*, 35(4):585–587, Aug. **1954.** fig., 7 eqs. Append. ref. Also in Texas. Agricultural and Mechanical College. Dept. of Oceanography, Contract N7onr-48703, Project NR 083-061, Technical Report, No. 5, June **1953.** 5 p. fig., 7 eqs. **DWB**—Time changes in the thickness of a thin surface of a two layer ocean model are proportional to the curl of the wind stress if accelerations are sufficiently small. *Subject Headings:* **1. Wind driven surface water 2. Ocean-atmosphere interaction.**—*Author's abstract.*

9F–78 551.464(265)

Fukuoka, Jiro and Tsuiki, Iwao (*Central Met. Obs., Oceanog. Sec.*), **On the variation of chlorinity in the Kuroshio Area.** *Oceanographical Magazine*, Tokyo, 6(1):15–23, Aug. **1954.** 7 refs., table, eq. **DWB**—Chlorinity data obtained by ocean weather ships south of Japan in 1951 and 1952 are presented and discussed with particular attention to the low chlorinity in summer. Precipitation and evaporation data are also presented and a close correlation is found to exist between these factors and chlorinity. *Subject Headings:* **1. Chlorinity variations 2. North Pacific.**—*G.T.*

9F–79 551.465(261)

Hansen, Walter, **Neuere Untersuchungen über Meeresströmungen.** [New investigations on ocean currents.] *Naturwissenschaften*, 41(9):202–205, I May **1954.** 5 figs., 3 refs. **DLC**—A world map of surface ocean currents is given. Water mass transport is analyzed into wind drift, gradient and density currents. Results of recent investigations into detailed thermal structure of Gulf Stream are summarized. The process of intermingling of adjacent currents by cutting off meanders is illustrated. *Subject Headings:* **1. Ocean currents 2. Gulf Stream.**—*C.E.P.B.*

9F–80 551.556:551.461.2(266)

Hidaka, Koji, **A contribution to the theory of upwelling and coastal currents.** *American Geophysical Union, Transactions*, 35(3):431–444, June **1954.** 7 figs., 5 tables, refs., 56 eqs. **MH-BH**—A theory of upwelling and coastal currents induced by longshore and offshore winds is derived, taking the effects of Coriolis forces and horizontal and vertical mixing into account. In the first place, it is shown that an upwelling circulation can be caused in the vertical plane perpendicular to the coast by a wind blowing parallel to the coast in such a manner that, in the Northern (Southern) Hemisphere, the coast is on the left-hand (right-hand) side of an observer with his back to the wind. The result agrees with the facts observed in the regions off the Southern Californian and Peruvian coasts very satisfactorily. The velocity of upwelling is computed at about 80 m/month, a value consistent with that estimated from observed hydrographic data. Next, it is shown that an offshore wind blowing perpendicular to the coast can also give rise to a similar circulation in the same vertical plane, but in this case with much weaker intensity. From these results it can be concluded that the most intense upwelling will occur when the wind makes an angle of 21.5° with coast line in an offshore direction. In addition to these circulations in the vertical plane, there exist horizontal currents parallel to the coast. These will contribute to the formation of the coastal or longshore currents much debated recently. The horizontal components of the motion under consideration show a vertical variation very similar to the Ekman spiral at some distance from the coast. (*See also* 5.4–160, April 1954, *MAB.*) *Subject Headings:* **1. Upwelling 2. Wind driven currents.**—*Author's abstract.*

9F–81 551.463

Kampa, Elizabeth M. and Boden, Brian P. (*both, Scripps Inst. of Oceanog., La Jolla, Calif.*), **Submarine illumination and the twilight movements of a sonic scattering layer.** *Nature*, London, 174:869–871, Nov. **1954.** 3 figs., 5 refs.—Reprinted as *California. Univ. Scripps Institution of Oceanography, La Jolla, Contributions*, 1955, issued July **1957.** p. 13–17. **DWB**—A graph shows the twilight (1800–2100 h) ascent of a sonic scattering layer in the San Diego Trough on June 3 and July 1, compared with a parallel ascent of the level of illumination with which this layer was associated earlier in the afternoon—the latter lays behind the scattering layer from 1830–1950 h. It has split into 2 layers during migration on 2 consecutive evenings. Descent during the morning (drawn) hours is shown by a bathogram. Evidence is that upper part of the scattering layer is

composed of small organisms and the lower portion by fish (predators), which live off the micro-organisms. *Subject Headings:* **1. Submarine illumination 2. Sonic scattering.**—*M.R.*

9F–82 551.521.17:551.463

*Lenoble, Jacqueline (*Physics Lab., Museum, Paris*), **Contribution à l'étude du rayonnement ultraviolet solaire, de sa diffusion dans l'atmosphère et de sa pénétration dans la mer (2me et 3me parties).** [Contribution to the study of ultraviolet solar radiation, its atmospheric diffusion and its penetration into sea (Pts. 2 and 3).] *Annales de Géophysique*, 10(3):187–225, July/Sept. **1954.** 5 figs., 7 tables, 28 refs., eqs. French and English summaries p. 187 and 210. (Extract from dissertation for Doctorate.) **MH-BH**—Ultraviolet luminance of the zenith sky was automatically recorded. A good agreement with theory was found, except during cloudiness. Natural haze and city dust affect the results. Instruments used are described and observational results presented in tables. Further measurements up to 50 m deep were made in the sea by means of a spectrograph placed in a water tight box. The extinction coefficient is computed and the ratios of radiation in different directions are given. Theoretical relations are outlined. (For Pt. 1, *see* 6.6–205, June 1954, *MAB.*) *Subject Headings:* **1. Ultraviolet radiation penetration in sea 2. Ultraviolet sky brightness 3. Zenith sky brightness data 4. Spectrophotometry of sea.**—*A.A.*

9F–83 532.593:551.461.2

Pierson, Willard J., Jr. (*New York Univ. College of Engr.*), **An interpretation of the observable properties of "sea" wave in terms of the energy spectrum of the Gaussian record.** *American Geophysical Union, Transactions*, 35(5):747–757, Oct. **1954.** fig., 15 refs., 34 eqs. **MH-BH**—The results of a basic paper in communication theory by Rice are applied to ocean waves. On the basis of new results obtained by Neumann on the nature of wave spectra, many complicated properties of the waves are explained theoretically. It is shown that the average of the time intervals between successive crests does not yield a "period" which is representative of the *period* where most of the spectral energy is concentrated. It is shown that the formula $L = gT^2/2\pi$ does not apply to sea conditions. An explanation of the "period" increase of ocean swell is given which does not depend upon selective attenuation of the low *period* waves in the spectrum. *Subject Headings:* **1. Ocean wave spectra 2. Ocean wave periods.**—*Author's abstract.*

9F–84 551.465:551.556(266)

Posner, Gerald S., **The Peru current.** *Scientific American*, 190(3):66–71, March **1954.** (illus.) **DWB**—Popularly written and illustrated account of the Peru current which flows north along the western coast of South America. Particular attention given to the thermal and chemical characteristics of the current (largely due to upwelling) which make it so rich in marine life. The warm current, El Niño, which totally or partially displaces the Peru current about every seven years and causes such catastrophic effects on marine and bird life is discussed from observations of the Yale Expedition of 1953. El Niño is thought to be of meteorological origin. The cover of this issue of Scientific American features colored illustrations of oceanographic instruments. *Subject Headings:* **1. Wind driven current 2. Peru Current 3. El Niño current 4. Eastern South Pacific.**—*M. P. Kramer.*

9F–85 551.465

Post, Louis A. (*Oceanographer, U. S. Navy Hydrographic Office*), **A practical method for the prediction of the surface current of the ocean.** *Tellus*, 6(1):59–62, Feb. **1954.** 3 figs., 5 refs. **MH-BH**—A method is advanced for the prediction of surface currents based on the stability of computed dynamic currents. Wherever the latter are known and, simultaneously, the measured (geomagnetic) current and local wind direction, speed and duration are known, the vector difference between the measured and the computed currents is assumed to be the portion of the current induced by the wind. The hypothesis is demonstrated empirically by a correlation of the above factors based on data obtained during a recent oceanographic survey. The predicted surface current vector is shown to be the resultant between a forecast wind-current and a permanent dynamic current. A new type of survey is proposed to make feasible the complete correlation of these factors. *Subject Heading:* **1. Ocean current forecasting.**—*Author's abstract.*

9F–86 551.46:06

*Smed, Jens (*I.C.E.S., Service Hydrographique*), **Report on work carried out by the Hydrographic Service of the International Council for the Exploration of the Sea, 1951–1954.** *I.U.G.G. Association of Physical Oceanography, Rome, Sept. 14–25, 1954, Procès-Verbaux.* Bergen, **1954.** p. 148–149. **DWB**—Important results are reported in the following: 1) *Bulletin Hydrographique*—a publication of oceanographic data (temperature, salinity, ph, excess base content of various constituents of sea water in the North Sea, North Atlantic and adjacent waters) issues for 1948 and 1949. 2) Hydrographic Card Index, covering the same regions as the Bulletin. 3) Wind data of the North Sea.

4) Synoptic Hydrographic Charts, 5) Variation of surface water temperature. Observational data from vessels crossing the N. Atlantic in operation since 1876 by the Danish Meteorological Institute showing a rise of temperature beginning in 1920, with highest values in 30's and 40's.—6) Homogeneity of water column in the southern North Sea—the study was made in order to find out in which areas surface observations of temperature and salinity were representative for the whole water column. *Subject Headings:* **1. Oceanographic research 2. Oceanographic data 3. International Council for the Exploration of the Sea.**—*A.M.P.*

9F–87 551.46(08)

Texas. Agricultural and Mechanical College. Dept. of Oceanography and Meteorology, **Contributions in oceanography and meteorology,** Vol. 2, Numbers 31–59, **1954–1956.** 435 p. figs., tables, eqs., refs., bibliogs. Vol. 1, Numbers 1–30 appeared with title: Collected Reprints in Oceanography and Meteorology, 1950–1954. (*See* 6.10–1, Oct. 1955, *MAB.*) **DWB**—For listing of contents of Vol. 2, *see* 9(2), Feb. 1957, *MAB.* Pertinent articles abstracted separately. *Subject Heading:* **1. Oceanography reprint collections.**

9F–88 551.509.5:532.59:551.46

Vollbrecht, Kurt, **Beiträge zum Problem brandender Wellen.** [Contribution to the problem of breaking waves.] *Acta Hydrophysica,* Berlin, 2(1):10–30, **1954.** 6 figs., 8 tables, 11 refs., 18 eqs. **DLC**—The wave reflection theory of Munk and Taylor is critically reviewed, outlining some of its shortcomings. The author computes the changes in propagation velocity, wave length, direction of waves and attenuation. Tables for the characteristic values are presented. Further improvement can be achieved only by actual observations. *Subject Headings:* **1. Breaking waves 2. Wave theory. I. Munk, W. H.**—*A.A.*

9F–89 551.556:551.465

von Arx, William S., **A laboratory model of the wind-driven ocean circulation.** *Weather,* 9(6):170–176, June **1954.** 4 figs., 3 refs., 2 eqs. **DWB**—A model is described in which planetary vorticity is reproduced by stretching or shortening a vertical column of water as it moves in a rotating paraboloid bowl. Models of continents were inserted; winds provided by blowers. The surface circulation of the N. Hemisphere oceans, except Arctic, was well reproduced, including segregated masses of water. Some difficulties are discussed. *Subject Headings:* **1. Wind driven currents 2. Oceanic circulation models.**—*C.E.P.B.*

9F–90 551.465

von Arx, William S. (*Woods Hole Oceanog. Inst.*), **Some techniques for laboratory study of the primary ocean circulation.** U. S. Office of Naval Research, Proceedings of the First Symposium on the use of Models in Geophysical Fluid Dynamics, Sept. **1953.** p. 89–99. 5 figs., 12 refs., eq. **DWB, DLC** (QC809.F5U5). Also issued as: Woods Hole Oceanographic Institution, Contract N60nr-27701 (NR-083-004), Contribution, No. 681. **1954?**—A rotating basin 200 cm in diameter (the 3rd model constructed at Woods Hole) is described and illustrated, and experiments designed to simulate the circulation and currents in the N. Atlantic and N. Pacific are discussed. The elaborate optical apparatus for producing a stationary image in a rotating basin is also described and illustrated. Artificial heating, wind stress, simulated orography and density give fairly realistic results for Atlantic and Pacific Basins. It is concluded that wind stress is sufficient to cause known oceanic circulation without considering density. However, differences in density induced by wind and evaporation may be cause of maintenance of circulation during variable winds. *Subject Headings:* **1. Rotating bowl model of oceans 2. Oceanic circulation. I. Woods Hole Oceanographic Institution.**—*M.R.*

9F–91 551.506.5(98)

Webster, Clifford J., **The Soviet expedition to the Central Arctic.** *Arctic,* Montreal, 7(2):59–80, Sept. **1954.** 15 figs., 13 refs. Metcalf, W. G., **A note on Arctic oceanography and the Lomonosov Range.** *Ibid.,* p. 108–109. 8 refs. **DLC**—Detailed description and good photographs of the Soviet Arctic expedition of 1954. The account is based on Russian press reports. The expedition, largest of its kind so far, involved establishment of two drift stations, operation of a "high latitude air expedition" and regular flights by "flying laboratories." These latter made several flights, some of them reaching the North Pole. Results of these flights, whose purpose was meteorological and ice measurement, are not yet available. History and results (including meteorological information) of earlier Soviet Arctic expeditions are summed up. In his note W. G. Metcalf, referring to Webster's paper, discusses findings of American investigators in connection with the submarine Lomonosov Range. *Subject Headings:* **1. Arctic expeditions 2. History of Soviet Arctic expeditions 3. Soviet Arctic. I. Metcalf, W. G.**—*G.T.*

1955

9F–92 551.46:91.04(99

Capurro, Luis R. A., **Expediciones oceanográficas actuales en el mar epicontinental argentinc** [Current oceanographical expeditions to the epicontinental Argentine ocean.] Buenos Aires Ministerio de Marina, Dirección General de Navegación e Hidrografía, Departmento Oceanografía **1955.** 13 p. 8 figs. **DLC**—The hydrographic and physical oceanographic work conducted by the Argentine Navy since 1949 in the seas around the Argentine are described, and detailed chart presented showing results of surveys and isohaline and isothermal charts for the sea surface and 50 m depth in May–June 1954. The 1954–5 expedition of the new icebreaker *General San Martin* to th Weddell Sea is also described and ice and current conditions outlined briefly. The Weddell Sea is said to be permanently ice covered, and the circulation of the water cyclonic. Results of bathy thermograph observations will be published in detail. *Subject Headings:* **1. Oceanographic expedi tions 2. Weddell Sea.**—*M.R.*

9F–93 551.556.8:551.46

Charney, J. G. (*Institute for Advanced Studies Princeton, N.J.*), **The generation of oceani currents by wind.** *Journal of Marine Research*, New Haven, Conn., 14(4):477–498, **1955.** 3 figs. 12 refs., 41 eqs. **DWB, DLC**—Rossby's investigations into the adjustment of velocity and pressur in ocean currents is considered with "the explicit assumptions that wind stresses impart momentum slowly enough for transverse horizontal and vertical motions to create the Coriolian mass adjustmen almost instantaneously." The mathematical approach developed by the author for treating larg scale atmospheric disturbances is applied to large scale oceanic currents, that is, currents generate in an infinite double-layer ocean by the action of various distributions of wind stress and to the case of an ocean with parallel boundaries to show the necessity for the development of a narrow intens current near the boundaries. Also, an attempt is made to consider the dynamical effects of th variation of the Coriolis parameter. The paper includes a derivation of the balance equations, th adaptations of the quasi-geostropic equations to single- and double layer oceans, the incorporatio of wind stress with the balance equations, generation of wind currents in a double-layer ocean, th counter jet and the effect of the variation of the Coriolis parameter. *Subject Headings:* **1. Win driven currents 2. Ocean currents 3. Coriolis force.**—*I.L.D.*

9F–94 550.342

Darbyshire, J., **Refraction of microseisms at Island stations.** *Royal Astronomical Society Monthly Notices, Geophysical Supplement*, 7(3):147–152, **1955.** 4 figs., 10 refs. **DLC.** Also issue as *National Institute of Oceanography, Wormley, Collected Reprints*, 4(141), **1956. DWB**—Refractio diagrams of G-s microseisms are drawn for the island of Bermuda. It is assumed that the wave are surface waves between the ocean and the seabed of the type first described by Stoneley (*i.e.* where the shallower the water the greater the wave velocity). The diagrams show that the effect o refraction of the energy of the incident waves is very marked, particularly for waves approachin from the N-E and S-W quadrants. The effect explains some of the anomalies that have been found in Bermuda. *Subject Headings:* **1. Microseismic refraction 2. Bermuda.**—*Author's summary (I.L.D.).*

9F–95 551.506.5:551.46:91.04

Dugan, James, **"Calypso" oceanographic expeditions.** *American Geophysical Union, Trans actions*, 36(5):893–896, Oct. **1955. DWB, DLC**—Founded by J.-Y. Cousteau and directed by the French National Center for Scientific Research, "Calypso" Expeditions have added free divin to classic marine instrumentation. The "Calypso" research team which, with its Marseille cente Office Française de Recherches sous-Marines, numbers fifty divers, seamen and technicians, employ the 320-ton research vessel, MS "Calypso," and a 60-ft converted trawler, "Espadon." The grou employs underwater still and cinecameras and submersible television apparatus in both handhel and automatic depth units on cables. Carrying scientific parties up to ten people, "Calypso" sinc 1951 has undertaken a general monography of Abu Latt Island in the Farsan Bank of the Red Sea underwater excavation of a Greek cargo ship, sunk circa 205 B.C., off Marseille; a geodetic surve of the bottom of the Persian Gulf off Trucial Oman; hydro-archeological surveys in the Aegean an Ionian Seas; and many sorties of two or three weeks in the Mediterranean for biological, geological and chemical studies. A continuing investigation of the deep scattering layer and bottom phenomen is being made with automatic electronic flash cameras built at Massachusetts Institute of Technology About 30,000 photographs have been taken in the Mediterranean Sea, the Red Sea, and the Indian Ocean. These cameras are also used on the French Navy bathyscaphe FNRS 3. Camera station of 3000 ft down have been attained. The DSL photo evidence has not shown a clear case for sona interference by organisms. Photos made above and below the diffusion layer have often shown a many microorganisms, siphonophores, medusas, shrimps, etc., as in the layer itself. No large athletic animals, such as squids, have been found in the photographs of the DSL. *Subject Headings*

1. Oceanographic expeditions 2. "Calypso" expeditions 3. Mediterranean Sea 4. Red Sea 5. Indian Ocean.—*Author's abstract.*

9F–96 518.2:551.461.2:525.6

Groves, Gordon W. (*Scripps Inst. of Oceanog., La Jolla, Calif.*), **Numerical filters for discrimination against tidal periodicities.** *American Geophysical Union, Transactions*, 36(6):1073–1084, Dec. **1955.** 4 figs., 4 tables, 4 refs., 20 eqs. **DWB, DLC.** Reprinted as *California. Univ. Scripps Institution of Oceanography, La Jolla Contributions*, 1955, issued July **1957.** p. 983–994. **DWB**—Tidal contributions to a sea-level record can be reduced by a large factor by taking special weighted averages of hourly values. In the residual record it is possible to recognize changes of as little as a few millimeters taking place in a few days. The method might be useful in other geophysical problems. *Subject Headings:* **1. Sea level computations 2. Tides.**—*Author's abstract.*

9F–97 551.515.2:551.461.2(521.27)

Hisamoto, S., **Meteorological high tide in Tokyo due to typhoons, Pt. 2.** *Journal of Meteorological Research*, Tokyo, 7(11):740–745, Dec. **1955.** 2 figs., 4 tables, 2 refs., eq. In Japanese; English summary p. 740. **DWB, DLC**—In the previous paper, frequency of the occurrence to be expected for various heights of storm tide in Tokyo was computed statistically by OGAWARA's method. The data utilized there were for 27 yrs. Recently, the data for 50 yrs since 1893 were found, and a similar calculation was performed by making use of them. The results obtained are as follows: Storm tides with heights larger than 300 cm, 350 cm, 400 cm, 450 cm, 500 cm and 550 cm may be expected statistically to occur every 15, 30, 40, 50, 65 and 80 yrs. On account of abundance of data, the above values of corresponding periods become much shorter at larger heights of storm tide, compared with the results in the previous paper. (For Pt. 1, *see* 7J–149, Oct. 1956, *MAB.*) *Subject Headings:* **1. Hurricane tides 2. Typhoon effects 3. Tokyo, Japan.**—*Author's abstract.*

9F–98 551.526.6:551.464(265.4)

Hishida, Kozo (*Maizuru Marine Obs.*), **On the coastal water and its relation to the oceanic water. Pt. 2, Statistical study on the specific gravity of sea waters in the monthly interval.** *Oceanographical Magazine*, Tokyo, 7(1):1–4, June **1955.** 3 figs., table, 2 refs. **Pt. 3, Analytical study on the annual variation of coastal surface water temperature.** *Ibid.*, p. 5–10. 3 figs., 2 tables, 4 refs., 5 eqs. **DWB, DLC**—Monthly and seasonal variations of frequency distributions of specific gravity in coastal waters of the Japan Sea are analyzed and found to be related to the type of rainfall. Results of a harmonic analysis of coastal water temperatures, of corresponding air temperatures and of ocean temperatures are presented and discussed in connection with the principal factors affecting them (currents, meteorological factors). *Subject Headings:* **1. Gravity distribution in sea water 2. Sea temperatures 3. Sea of Japan.**—*G.T.*

9E–99 551.465

Ichiye, Takashi (*Central Met. Obs. Oceanographical Section*), **A short note on the vertical current in the ocean.** *Oceanographical Magazine*, Tokyo, 7(1):49–54, June **1955.** 2 figs., 4 refs., 6 eqs. **DLC**—A mathematical treatment is given on the problem of upwelling in an ocean under the simplified assumption that ocean currents are maintained solely by the effects of wind stress and density stratification under the vertical mixing process. *Subject Heading:* **1. Upwelling.**—*G.T.*

9F–100 551.464

Lewis, George J., Jr. and Rakestraw, Norris W. (*both, Scripps Inst. of Oceanog., La Jolla, Calif.*), **Carbohydrate in sea water.** *Journal of Marine Research*, 14(3):253–258, **1955.** 3 tables, 6 refs. **DWB.** Reprinted as *California. Univ. Scripps Institution of Oceanography, La Jolla, Contributions*, 1955, issued July **1957.** p. 517–522. **DWB**—Results of tests for carbohydrates made in June 1952 and Aug. 1954 (using anthrone or N-ethyl carbazole as specified) of surface sea water from the La Jolla, Calif. area run through a type HA millipore filter having a porosity of 0.5μ to remove most, if not all, colloidal material are reported. Samples were obtained from near the Scripps Pier and the Kelp Beds. Carbohydrate content at 0, 3, 7, 10 and 20 m depth at four shallow water stations are tabulated and compared with data from a number of infiltered samples at various depths and places along the Calif. coast and off Mexico and Central America. Values of 0.1 to 0.4 mg/l. indicate mainly dissolved matter, occasional values of 5–8 mg/l. found in coastal lagoons indicate suspended matter from land. *Subject Heading:* **1. Carbohydrates in sea water.**—*M.R.*

9F–101 551.465

Lineĭkin, P. S., **K dinamike ustanovivshikhsia techeniĭ v neodnorodnom more.** [Dynamics of currents established in a heterogeneous sea.] *Akademiia Nauk SSSR, Doklady*, 105(6):1215–1217, Dec. 21, **1955.** ref., 6 eqs. **DLC**—In an earlier study (P. S. LINEĬKIN, *DAN*, 101(3)1955) the characteristics of the lower boundary of a baroclinic layer of the sea which was taken as ratio of the

velocity of gradient convective flow to analogous flow at the surface failed to take into account drift currents. This defect is corrected by another absolute criterion for determining the depth of penetrations of wind currents in a non-homogeneous deep sea. It is shown that the ratio of complete currents to drift and gradient convective velocity is expressed by the following formula:

$$\frac{S\,ds}{S\,con} = \frac{\pi}{y\rho^2}\,\frac{\mu_z{}^2}{w_Z^2 L^4}.$$

And the mean velocity of flow along the vertical in a baroclinic layer is:

$$V_m = \frac{L^2 T}{\pi^2 \mu_z H}$$

so that the mean velocity of flow increases with increased stability of stratification in the sea. *Subject Headings:* **1. Baroclinic layer of the sea 2. Drift currents.**—*I.L.D.*

9F–102 551.463/4

Moriyasu, Shigeo (*Kobe Marine Obs.*), **On the variation of water temperature and chlorinity after heavy precipitation in the Osaka-Wan and Kii-Suido.** *Oceanographical Magazine*, Tokyo, 6(4):175–180, Jan. **1955.** 9 figs. **DWB**—Water temperature and chlorinity measurements were made in Osaka Bay after heavy precipitation in July 1952 and July 1953. Data on the abnormal temperature and chlorinity distributions (due to the inflow of rover waters) are presented. The role of horizontal and vertical diffusion and of advection in producing the anomalous distributions is analyzed. *Subject Headings:* **1. Water temperature variations 2. Chlorinity variations 3. Precipitation effects 4. Osaka Bay, Japan 5. Kii Channel.**—*G.T.*

9F–103 532.59:551.46

Munk, Walter H. (*Scripps Inst. of Ocean., La Jolla, Calif.*), **High frequency spectrum of ocean waves.** *Journal of Marine Research*, New Haven, Conn., 14(4):302–314, **1955.** 2 figs. (incl. photo), 4 eqs. **DWB, DLC.** Reprinted as *California. Univ. Scripps Institution of Oceanography, La Jolla, Contributions, 1955*, issued **1957.** p. 52–64. **DWB**—The author discusses the meaning of wave spectra and their analysis, the use of sun glitter to measure mean square slopes of ocean waves, the distribution of slopes, the mean square curvature as predicted by the NEUMANN spectrum, dissipation of wave energy, the transfer of momentum from wind to water, and the value of the statistical spectrum approaches to the study of ocean waves. *Subject Headings:* **1. Ocean wave spectra 2. Ocean wave energy.**—*I.L.D.*

9F–104 551.521.3:551.464(262.3)

*Polli, Silvio, **Ambiente luminoso subacqueo nella laguna di Venezia.** [Underwater luminous environment in the Lagoon of Venice.] *Archivio di Oceanografia e Limnologia*, Rome, 10(1/2):1–27, **1955.** fig., 38 tables, 8 refs. **DLC.** Also in: *Trieste. Istituto Sperimentale Talassografico, Pubblicazioni*, No. 319, **1955.**—The transmission of luminous radiations through the water of different zones and channels of the Venice-lagoon, has been measured by means of a submarine photometer with photo-cells. The extinction coefficients for the group of radiations corresponding to natural light and to the following colors: violet, blue, green, yellow and red, as well as the percent-ratio between the intensities of illumination at various depths and the ratios between direct and diffused light, have also been determined. The extinction coefficients change with the tides and currents, and according to the seasons, winds and other contingent causes. They are five times as great as those measured in the open sea, reaching maximum values for the extreme radiations of the visible spectrum and minimum values for the blue-green and green-yellow radiations. *Subject Headings:* **1. Extinction coefficient in sea 2. Venice, Italy.**—*Author's abstract.*

9F–105 532.5:551.468:551.46

Schriever, William (*Oklahoma Univ., Physics Dept.*), **Were the Carolina bays oriented by gyroscopic action?** *American Geophysical Union, Transactions*, 36(3):465–469, June **1955.** 2 figs., 3 refs., 12 eqs. **DWB**—All the effects of the spin of the earth on the water in a circular eddy two miles in diameter and 100 ft deep, having a water velocity of four miles per hour near the shore, were investigated. The deflection-to-the right, together with the centrifugal reaction out from the center of the eddy, cause the level of the water everywhere near the shore to be approximately six inches higher than it is at the center of the eddy. The change in the centrifugal reaction out from the earth, causes the water (in clockwise eddy) to be less than a sixteenth of an inch higher near the north shore than near the south shore. It appears that these effects could cause neither ellipticity, nor influence the orientation of an eddy, for example, a Carolina Bay. Contrary to the assumption by COOKE (1954), an eddy does not exhibit gyroscopic action. *Subject Headings:* **1. Whirlpools 2. Coastal erosion 3. Carolina bays.**—*Author's abstract.*

9F–106 551.465

Schule, John J. and Ropek, John F., **U. S. Navy Hydrographic Office synoptic and prognostic wave charts.** *U. S. Hydrographic Office, Technical Report*, TR-16, May **1955.** 22 p. 13 figs., table, 3 refs. **DLC** (GC211.S3)—Experimental synoptic wave charts and prognostic wave charts, which can be transmitted by radio facsimile, have been prepared by the U. S. Hydrographic Office, since Dec. 1952 and their use has been demonstrated in planning for Meteorological-Oceanographic Survey Cruises, etc. The charts contain data on wind direction and speed, wave direction and height, and period frontal systems and pressure systems for 1200Z (with 0600Z data entered in a different color to show trends and fill in gaps); coastal areas are neglected. Predominant wave trains are shown by arrows, and using these and the synoptic weather chart (as an underlay) the contours of equal wave height are drawn and a prognostic wave chart compiled. A series (Jan. 7–13, 1954) of such charts is presented and examples of observed and forecast wave conditions tabulated and analyzed (for Jan. 11–12, 1954). *Subject Headings:* **1. Prognostic wave charts 2. Synoptic wave charts.**—*M.R.*

9F–107 551.465(265)

Sugiura, Jiro (*Hakodate Marine Obs.*), **On the transport in the Eastern Sea of Honshu, Pt. 1, Conditions during 1949/1950.** *Oceanographical Magazine*, Tokyo, 6(4):153–163, Jan. **1955.** 4 figs., table. **Pt. 2, Conditions during 1946–48.** *Ibid.*, 7(1):21–28, June **1955.** 5 figs., tables. **DWB, DLC**—Values of water volume transport obtained at ship stations east of Honshu (Kuroshio, Oyashio and Tsugaru current regions) are tabulated and presented in charts, for one-month periods from 1946 to 1950. *Subject Headings:* **1. Water mass transport 2. Ocean currents 3. Northwest Pacific.**—*G.T.*

9F–108 551.46

Sverdrup, H. U. (*Dir., Norsk Polarinstitutt*), **The place of physical oceanography in oceanographic research.** *Journal of Marine Research*, New Haven, Conn., 14(4):287–294, **1955.** 2 figs. **DWB, DLC**—The author stresses by means of specific examples the fundamental character of physical oceanography in the total field of oceanography, both as an independent self-sufficient discipline and as an auxiliary science to other marine sciences. The role of physical processes in explaining the poverty of phosphates and nitrates in both deep and shallow Mediterranean waters, the vernal blooming of phytoplankton, and the relative productivity of different ocean areas, are considered. *Subject Heading:* **1. Physical oceanography.**—*I.L.D.*

9F–109 551.46.018.3

Swallow, J. C., **A neutral-buoyancy float for measuring deep currents.** *Deep-Sea Research*, London, 3:74–81, **1955.** 8 figs., 8 refs. **DWB, DLC.** Also issued as *National Institute of Oceanography, Wormley, Collected Reprints*, 4(130), **1956. DWB**—The author describes the construction of a float and the acoustic transmitters capable of sending out a short pulse every few seconds for two or three days. A description is also given of the method for tracking a drifting float; this involves the use of hydrophones from which the signals are fed by way of separate tuned amplifiers into a double beam oscilloscope. Pulses from the floating transmitter are received at different times at the two hydrophones and the magnitude of the time-difference can be measured on the oscilloscope. "As the ship's head falls away from the wind direction, the time difference is observed as a function of the bearing of the line joining the hydrophones." It follows a "figure eight" polar diagram with sharp zero values when the bearing is at right angles to the line from the ship's position to the float. The results of observations are discussed and diagrams of the track of the float are presented. *Subject Headings:* **1. Ocean current measurement 2. Floats.**—*I.L.D.*

9F–110 551.461

Verploegh, G. and Groen, P., **De uitwerking van de wind over de Groningse Waddenzee op de hoogwaterstanden van Delfzijl.** [The effect of wind over the eastern part of the Dutch Wadden Zee on the height of high water at Delfzijl.] *Netherlands. Meteorologisch Instituut, Wetenschappelijk Rapport, W.R.* 55-009 (IV-010), **1955.** 9 p. fig., table, eqs. English summary on p. 9. **DWB**—A local wind effect in the Wadden Zee has been studied, separated from the overall North Sea effect. The resulting water level difference is $\Delta O = Cv^{2\cdot4}$. v—wind velocity. Probable values of C for various wind directions are listed and expressed as a trigonometric function. *Subject Headings:* **1. Sea level variations 2. Wadden Zee, Netherlands.**—*A.A.*

9F–111 535.5:551.521.16:551.463

Waterman, Talbot H. (*Osborn Zoological Lab., Yale Univ., New Haven, Conn.*), **Polarization of scattered sunlight in deep water.** *Papers in Marine Biology and Oceanography, Supplement to Deep-Sea Research*, Vol. 3:426–434, **1955.** 3 photos., 3 tables, 10 refs. **DLC**—Photographic measurements made at 30, 60, 100, 150 and 200 m depth in the Atlantic N.W. of Bridgetown, Bar-

bados, B.W.I. (13°N, 59°W) are discussed and illustrated. It is concluded that scattered sunlight is linearly polarized to considerable depth, the pattern depending on the sun's position to a depth of 200 m so the optical phenomena are important to both surface and deep sea fauna. *Subject Headings:* **1. Polarization of submarine daylight 2. Bridgetown, Barbados, B.W.I.**—*M.R.*

9F–112 551.509.312:551.465

Wilson, Basil W., **Graphical approach to the forecasting of waves in moving fetches.** *U. S. Beach Erosion Board, Technical Memorandum*, No. 73, April **1955.** 17 figs., 31 refs., 7 eqs. **DWB, DLC.** Reprinted as *Texas. A. and M. College. Dept. of Oceanography and Meteorology, Contributions in Oceanography and Meteorology*, 2(31/59):327–361, **1954/1956. DWB**—This paper describes the development and application of a graphical technique to the determination of maximum significant wave heights and periods attained by waves in moving wind systems. Existing deep water forecasting data, representing the work of SVERDRUP and MUNK (1947) and modifications since introduced by ARTHUR (1951) and BRETSCHNEIDER (1951, 1952), are assembled in a single chart over which a space-time wind-field representing any given moving wind system (in relation to a particular point of a coast) can be placed by superposition for the evaluation of the characteristics of the waves generated at any specific point in space and time within the wind field. The space-time tracks of the waves can then be followed in their advance to the coastal station and the time of arrival, heights and periods there determined to give, in effect, a synthetically constructed wave spectrum for forecasting or hindcasting purposes. The method is applicable to both approaching and receding storms and permits of decay aspects being taken into account in the usual way. An example is given of the application of the method to the forecasting of wave conditions in the path of a hurricane. *Subject Headings:* **1. Forecasting waves 2. Wave in moving wind systems.**—*Author's abstract.*

9F–113 551.556.8:551.461

Woods Hole Oceanographic Institution, **Studies of the effect of wind on coastal waters.** Contract Cwb-8630, Quarterly Progress Report, Sept. 1–Nov. 15, **1955.** Pub. Dec. **1955.** 2 p. **DWB**—A brief report on the first stage of the contract to study the effect of wind on coastal water in Nantucket Sound to determine the wind setup relations and storm surge phenomena with eventual application to storm surge forecasting for Nantucket Sound. Preliminary studies showed that no effect of current wind on current tide level could be found, but if a lag of 10 hrs was allowed, a correlation existed when east winds raised and west winds lowered sea level. Pressure (inverted) showed a relationship amounting to ±4 ft and wind about the same effect after pressure effects were removed. *Subject Headings:* **1. Wind effects on water level 2. Nantucket Sound.**—*M.R.*

9F–114 551.46(265/266)

Wooster, Warren S. and Jennings, Feenan, **Exploratory oceanographic observations in the eastern tropical Pacific, January to March 1953.** *California Fish and Game*, 41(1):79–90, **1955.** 6 figs., table, 15 refs. Reprinted as *California. Univ. Scripps Institution of Oceanography, La Jolla, Contributions, 1955*, issued July **1957.** p. 163–174. **DWB**—Oceanographic results of an experimental fishing expedition to the eastern tropical Pacific early in 1953 are discussed. Along a line at approximately 95°W, both biological and other oceanographic observations resembled those previously described in the central equatorial Pacific. Between the Galapagos Island and Ecuador the presence of unusual surface conditions (high temperature and low salinity) is related to the occurrence of "El Niño" observed along the coast of Peru. *Subject Headings:* **1. Oceanographic surveys 2. Tropical Pacific.**—*Authors' summary.*

9F–115 551.46.018.9:525.6

Yakame, K. (*Factory of Met. Instruments, Ibaragi, Japan*), **An automatic tide station.** *Meteorological Society of Japan, Tokyo, Journal, Ser. 2*, 33(5):181–187, Nov. **1955.** 14 figs. (incl. photos), 6 refs. In Japanese; English summary p. 181. **DWB, DLC**—For the purpose of high water forecast, an automatic tide station, which can send radio signals and can be operated at remote position, has been developed. The gage consists of the transmitter and the receiving set. Both sets are controlled by the clocks, and the height of the tide is recorded on the chart once an hour. The frequency of the radio wave is 414 mc sec^{-1}. The principle of remote recording is that of the so-called OLLAND system. Synchronization of the transmitter and the recorder is caused by a small permanent magnet motor with a speed regulator. The automatic zero adjust of the record is made by a long sign of the signal in every cycle, and the height of tide is marked with a dot by the short signs on the chart. This equipment has been tested at the Central Meteorological Observatory and the Tsukishima tide station in Tokyo, since Oct., 1953. The accuracy of the measurement of tide height was within about 1%. *Subject Headings:* **1. Automatic tide gage 2. Tide height measurement.**—*Author's abstract.*

9F–116 551.465

Yoshida, Kozo (*Geoph. Inst., Tokyo Univ.*), **Coastal upwelling off the California coast.** *Records of Oceanographic Works in Japan, Tokyo, n.s.*, 2(2):8–20, Oct. **1955.** 4 figs., table, 8 refs., 30 eqs. **DWB**—Data and theory obtained from cruises off the Calif. coast during 1949, 1950 and 1951 indicate that coastal upwelling does not extend more than 50 km or perhaps 100 km off the coast, when N.N.W. winds prevail for a week or so, and that offshore upwelling due to convergence may accompany the coastal convergence. The effects are extremely variable and depend on wind and coastal effects. Details and mechanisms are presented and explained by graphic analysis of data and by theory, and the theoretical and observed results found compatible. *Subject Headings:* **1. Upwelling 2. Oceanographic cruises 3. California Coast.**—*M.R.*

9F–117 551.465

Yoshida, Kozo, **A note on dynamics near the equator, in view of the recent observations in the eastern Equatorial Pacific.** *Oceanographical Society of Japan, Tokyo, Journal*, 11(2):33–37, 1955. 2 figs., 14 refs., 13 eqs. Reprinted as *Tokyo. Univ. Geophysical Institute, Geophysical Notes*, 8(2), *Contribution* No. 32, **1955. DLC**—It is pointed out that a model of dynamical balance discussed by WEENINK and GROEN (1953) appears to lead to a solution which involves a discontinuity in the vicinity of the equator. The origin of this unreasonable singularity is found to be in the assumed density model. A modification for density model near the equator which seems more realistic in view of recent observations is suggested to yield a reasonable solution. *Subject Headings:* **1. Oceanic circulation models 2. Ocean density models 3. Equatorial Pacific.**—*Author's abstract.*

1956

9F–118 551.46.018

Carruthers, J. N. (*British Nat. Inst. of Oceanog.*), **Some very simple devices for various oceanographical uses.** Papers in Marine Biology and Oceanography, Supplement to Vol. 3, *Deep-Sea Research:* 169–177, **1956.** 6 photos, 3 refs. **DLC.** Also issued as *National Institute of Oceanography, Wormley, Collected Reprints*, Vol. 4(128), **1956. DWB**—An account is given of some very simple ways of determining the underwater course of suspension and towing lines in respect to both of slope and direction. The means employed is to enclose pendulums and compasses within suitable vessels containing hot gelatine solution. These are affixed to the lines while the gelatine solution is hot, so that after the cooling which comes from immersion in the sea, the pendulums and compasses become immovably fixed to give the necessary records. It is shown that the device could serve very usefully in studies of pelagic trawl, and could be adopted to determine the shape of trawling cables leading all the way down into the greatest ocean depths. Photographs of the jelly bottles, the apparatus used to measure warp, slope, etc. are presented. *Subject Heading:* **1. Oceanographic instruments.**—*From author's summary.*

9F–119 551.465(261)

Cartwright, D. E. (*Nat. Inst. of Oceanog.*), **On determining the directions of waves from a ship at sea.** *Royal Society of London, Proceedings, Ser. A*, 234:382–387, **1956.** 2 figs., table, 7 refs., 9 eqs. **DLC.** Also issued as *National Institute of Oceanography, Wormley, Collected Reprints*, 4(143), **1956. DWB**—This paper describes a method by which a shipborne wave recorder can be used to determine directions and frequencies of component wave trains in fairly simple patterns of waves from the Doppler shifts observed on the ship steams at constant speed along a succession of different courses. Measurements of the relationship between wave frequency and velocity, made by R.R.S. "Discovery II" in the North Atlantic Ocean, agree with the classical relationships. *Subject Headings:* **1. Ocean wave direction 2. Wave recorders 3. North Atlantic.**—*Author's summary (I.L.D.).*

9F–120 551.46:592

Coe, Wesley R. (*Scripps Inst. of Oceanography, La Jolla, Calif.*), **Fluctuations in populations of littoral marine invertebrates.** *Journal of Marine Research*, New Haven, Conn., 15(3):212–232, **1956.** 9 figs., 30 refs. **DWB, DLC**—Fluctuations in populations of various species of marine invertebrates, several of them over many years, are recorded. Some of the data are quantitative, but most of them are merely estimates of relative abundance at the same season in successive years. Records of local fluctuations in populations of the Pismo clam extend over 25 yrs, those of dinoflagellates 20 yrs, and of Donax 58 yrs; records of the set of young oysters cover 70 yrs and those of the local production of oysters 100 yrs. These data offer no satisfactory evidence of persistent rhythmical periodicity in any of the species. Changes that have occurred in local populations of littoral invertebrates due to constantly changing environmental conditions and to the introduction of foreign species during the past half-century are recorded. Some of these changes have been

catastrophic. *Subject Headings:* **1. Marine invertebrates 2. Oceanic environmental influences.**—*Author's abstract.*

9F–121 551.465:551.556

Darbyshire, J. (*Nat. Inst. of Oceanog.*), **The distribution of wave heights.** *National Institut of Oceanography, Wormley, Collected Reprints*, 4(155), **1956.** 8 figs., 5 refs., eqs. (Reprinted from the *Dock and Harbour Authority*, London, May **1956.**) **DWB**—The "significant wave height" defined as the mean highest third of the waves observed in a given time interval (usually 10 to 15 min.) is used to make a statistical estimate of the state of the sea. The distribution of mean wave heights from weather ship data and from measurements taken at Casablanca are presented in graphs in which the frequency of occurrence of value of maximum wave height is plotted against maximum wave height for particular years and seasons. The significant wave height follows a definite statistical distribution in which its logarithm is distributed about a mean value according to the normal error law so that

$$y = A \exp -(\log x - \log a)^2/b^2,$$

where y—probability density, x—significant wave height, a—the most probable value of x. Specific equations for the various curves of observation are presented. *Subject Heading:* **1. Wave height distribution.**—*I.L.D.*

9F–122 551.46

Deacon, G. E. R., **Marine science in the Pacific area.** *Nature*, London, 177:353–355, Feb. 25, **1956. DLC.** Also issued as *National Institute of Oceanography, Wormley, Collected Reprints*, 4(148), **1956. DWB**—A summary of the sessions of the Interim Advisory Committee on Marine Sciences appointed by the Director-General of UNESCO to examine the needs of marine research. The meeting was held in Tokyo, Oct. 24–25, 1956. The discussions included trends in marine research, the need for interdisciplinary cooperation in oceanography, the kind of laboratory needed for marine research, the future function of the Advisory Committee, etc. Also a brief survey, the status of marine science in Japan, is presented. The various research institutions are listed. The research in marine physics, fisheries research, the theoretical work on oceanic circulation, research on chemistry of the sea and the work on instrumentation are described briefly. *Subject Heading:* **1. Oceanographic research.**—*I.L.D.*

9F–123 551.46

Deacon, G. E. R. (*Dir. Natl. Inst. of Oceanog.*), **Oceanography.** *The Sea Cadet*, (London?), 13(3):50–51, Nov. **1955.** photos.—Also issued as *National Institute of Oceanography, Wormley, Collected Reprints*, 4(134), **1956. DWB**—A short essay describing the scope of oceanography as a science, the problem with which it is concerned, such as the study of wave patterns, wind currents, interchange of energy between atmosphere and oceans, the practical aspects of navigation, fisheries, etc. *Subject Heading:* **1. Oceanography.**—*I.L.D.*

9F–124 551.46.018

Draper, Laurence, **Physicists at sea.** *Nottingham University Survey*, 6(1), Dec. **1956.** Reprint of 8 p. photos.—Also issued as *National Institute of Oceanography, Wormley, Collected Reprints*, 4(137), **1956. DWB**—A popular article describing the importance of proper instruments in studying the characteristics of oceans, such as the use of electronics, in studying wave properties; namely, the wave analyzer, the shipborne wave recorder, the nature of microseisms and theory of the production of microseisms as a consequence of wave research, measurement of the course and size of deep ocean currents by the electrical properties of water, the use of seismic techniques in studying the geology of ocean bottoms, etc. Photographs of various types of instrumentation, such as under water television, sono-radio buoy, etc. are presented. *Subject Heading:* **1. Oceanographic instruments.**—*I.L.D.*

9F–125 551.465:551.556

Fel'zenbaum, A. I. (*Inst. of Oceanog., Acad. of Sciences of the U.S.S.R.*), **Issledovanie sviazeĭ mezhdu vetrom, raspredeleniem plotnosti, urovnem i techeniiami neodnorodnogo moria.** [A study of the relationship between wind, density distribution, level and currents in a non-uniform sea.] *Akademiia Nauk SSSR, Izvestiia, Seriia Geofizich.*, No. 8:958–967, Aug. **1956.** 3 figs., 5 refs., 43 eqs. **DWB, DLC**—Previously established general relationships, between a stationary and complete flow density level and currents at individual horizons in a nonhomogeneous deep sea of any shape, are studied analytically in the case of the circulation in a rectangular sea. On the basis of a concrete example, it is shown that general relationships lead to correct physical conceptions on the nature of processes in the sea. The mathematical analysis is presented of complete flow distribution of density of the level and of the velocities of currents at individual horizons. *Subject Heading:* **1. Wind driven currents.**—(*Author's summary and I.L.D.*).

9F–126 551.461.2:551.556

Fel'zenbaum, A. I., **Sviaz' vetra s urovnem i ustanovivshimisia techeniiami melkogo moria.** [The relation of wind to water level and steady currents in a shallow sea.] *Akademiia Nauk SSSR, Doklady*, 109(1):80–83, July/Aug. **1956.** 4 refs., 27 eqs. **DLC**—A mathematical analysis of the problem involving the relationship between the velocities of steady currents and sea level produced by winds in a shallow sea for any configuration of the shore and bottom relief, but for a given dependent on both horizontal coordinates neglecting the Coriolis force in the hydrodynamic equation of motion and eliminating the nonlinear vertical terms and the terms due to horizontal exchange, and the use of the functions of full flow. The author discusses Poisson's equation for a nonhomogeneous medium and its solution for any contours of the sea is obtained by numerical integration by the method of nets; the formulas for determining the slope of the surface and the horizontal components of the velocity of the current are also discussed. *Subject Headings:* **1. Wind-sea level relationships.**—*I.L.D.*

9F–127 551.556:551.46:532.59

†Krylov, Iu. M., **Novye zarubezhnye issledovaniia vetrovykh voln.** [New foreign research on wind waves.] *Meteorologiia i Gidrologiia*, No. 9:49–54, Sept. **1956.** table, 9 refs., 13 eqs. **DWB, DLC**—The author summarizes the most important work carried out in the U. S. since 1947 on the theory and methods of calculating wave elements, on the basis of wind waves and of the methods of working up the results of measurements of ocean waves. The discussion covers the work of PIERSON and NEUMANN which aims at combining the results of classical hydrodynamic wave movements with probability theory. The relevant theoretical equations and a table giving the numerical values of elements of wind waves calculated by the theory of PIERSON and NEUMANN are presented. *Subject Heading:* **1. Wind wave research.**—*I.L.D.*

9F–128 551.46:551.556

Krylov, Iu. M., **O statisticheskom zakone raspredeleniia vysot trekhmernykh vetrovykh voln.** [A statistical law for the height distribution of three-dimensional wind waves.] *Meteorologiia i Gidrologiia*, No. 11:41–44, **1956.** 3 tables, refs., 3 eqs. **DWB, DLC**—The theoretical deviation of a dimensional function of distribution of wind waves is discussed and it is shown that the heights of waves recorded by a wave recorder are subject to the anti-dimensional law of distribution. Proceeding on the basis of a previous study (KRYLOV, IU. M., **Theory and calculation of wind waves in a deep sea.** *Moscow. Gosudarstvennyi Okeanograficheskii Institut, Trudy*, 26(38) **1954**) it is shown that the heights of three dimensional waves follow the normal law of distribution. The expression for the function of distribution of the height of the waves is derived; namely,

$$F = 1 + \frac{4}{\pi}\frac{H}{\overline{H}}\exp\left[-\frac{4}{\pi}\left(\frac{H}{\overline{H}}\right)^2\right] - \operatorname{erf}\frac{2}{\sqrt{\pi}}\frac{H}{\overline{H}}\Big),$$

where

$$\operatorname{erf}\chi = \frac{2}{\sqrt{\pi}}\int_0^x e^{-t^2}\,dt$$

(H—height of 3 three dimensional waves). The numerical values of the dimensionless magnitudes $H/\overline{H}$, values, showing the theoretical relationship between height of three dimensional waves having a probability F and height at a point h_P having the same probability, and data showing the theoretical dimensionless function of distribution of heights and actual stereophotographs are presented. *Subject Headings:* **1. Wave height distribution 2. Three-dimensional wind waves.**—*I.L.D.*

9F–129 551.524.4:551.526.6:551.46

Lacombe, H., **L'énergie des mers.** [Energy of oceans.] *La Météorologie*, Paris, Ser. 4, No. 44:371–391, Oct./Dec. **1956.** 13 figs., 4 refs. French, English and Spanish summaries p. 371. **DWB**—This is a broad descriptive and non-mathematical review of the problem of the energy exchange between the oceans and atmosphere. The discussion covers the following aspects: the thermal energy received by the ocean (solar radiation, convective and evaporative exchange with the atmosphere and condensation), depth penetration of the thermal energy, the mechanical energy imported by the wind through surface friction and the causes of the movement of water; contemporary knowledge on the oceanic circulation; local characteristics of currents; comparison of the oceanic circulation with the atmosphere and needed cooperation between the meteorologists and oceanographers. The article is provided with numerous diagrams illustrating various aspects of oceanic circulation. *Subject Headings:* **1. Energy exchange sea-atmosphere 2. Oceanic circulation.** —*I.L.D.*

9F–130 551.465:551.5

Lineĭkin, P. S., **O vetrovykh techeniiakh v glubokom more.** [Wind-induced currents in a de sea.] *Meteorologiia i Gidrologiia*, No. 12:26–33, Dec. **1956.** 11 refs., 13 eqs. **DWB, DLC.** Tra into English available for reference. **DWB** (M13 L7542w)—Beginning with a discussion of t importance of an understanding of the nature of wind induced currents in the complete theory ocean currents, the author proceeds to a theoretical analysis of currents induced by winds upon state of rest in a stably statified sea and from the point of view of a problem of the diagnosis currents in a heterogeneous sea. This investigation is based upon the hydrodynamic equations of baroclinic fluid and of the corresponding initial and limiting conditions for velocity, temperatu and salinity applicable to the conditions of the sea. The problem of wind induced currents analyzed as an approximation of the equation of state of marine waters and an averaging by dept of the value of the coefficient of turbulent exchange and of the vertical gradient of density in the se *Subject Heading:* **1. Wind driven currents.**—*I.L.D.*

9F–131 551.4

Longuet-Higgins, M. S., **Statistical properties of a moving wave-form.** *Cambridge Philosophic Society, Proceedings*, 52(2):234–245, **1956.** 2 figs., 5 refs., 82 eqs. **DLC.** Also issued as *Nation Institute of Oceanography, Wormley, Collected Reprints*, 4(132), **1956. DWB**—In the application the statistical properties of a random noise function to moving wave forms and to distinguishir between positive and negative direction (for example, finding the coefficient of reflection of wav from a fixed obstacle), it is necessary to consider a random function depending on both a space an time variable and statistical properties involving the motion of the surface as well as its configuratic at any time. In this study a mathematical development of two statistical distributions, namel the velocities of zero and the frequency of "twinkles" is presented. *Subject Headings:* **1. Wav motion theory 2. Statistical theory of waves.**—*I.L.D.*

9F–132 551.46.01

Martin, Jean, **Résultats des premiers travaux français effectués avec un mesureur électriqu de courant à électrodes remorquées.** [Results of the first French work with an electric currer meter with towed electrodes.] *Académie des Sciences, Paris, Comptes Rendus*, 243(19):1432–143 Nov. 5, **1956.** 3 refs., eqs. **DLC**—Successful testing of an electric ocean current meter (the firs of its type in France) is reported. Measurements made in the Indian and Southern oceans showe certain correlations between surface water temperature and the direction of currents. *Subje Headings:* **1. Current meters 2. Towed electrodes.**—*G.T.*

9F–133 551.556:532.593 551.5:656.6

Michie, J. E.: McLeod, K. T. and Graham, R. C., **Wind, weather and whitecaps: the problem of small craft.** *Royal Meteorological Society, Canadian Branch*, [*Publications*], 7(4), [**1956**]. 9 1 3 figs. **DWB**—The talk of Michie is not included in this issue. It involved problems of operator of small craft. The talk by McCleod on **Wind, weather and white caps** gives a lot of practica information on the generation of waves by wind, the effect of fetch; relations of height, speed, perio and time to each other and to wind and fetch; wave structure, surf, impact of waves against break waters, deep waves, wave forecasting, wave trains, etc. The talk by Graham on **Weather on the wate** has to do with predictions for sailing on a large lake—weather types and the kind of sailing weathe to be expected with each. *Subject Headings:* **1. Wind-wave relationships 2. Sailing weather** —*M.R.*

9F–134 551.4

Moriyasu, S. (*Kobe Marine Obs.*), **On the oceanographical conditions south off Honshū in 1954** *Oceanographical Magazine*, Tokyo, 7(2):105–113, Feb. **1956.** 6 figs., 2 tables, 7 refs. **DWB, DLC**— Monthly charts for 1954 show water temperature at 100 m depth south of Honshū. Current pattern and dynamic properties of the cold water region are discussed and illustrated by cross sections sounding diagrams, etc. *Subject Headings:* **1. Ocean temperature variation 2. Ocean curren variations 3. Japanese seas.**—*M.R.*

9F–135 551.4

Nakayama, Ichizo (*Maizuru Marine Obs.*), **On the upper limit of the proper cold water in th Sea of Japan.** *Oceanographical Magazine*, Tokyo, 8(1):65–67, Aug. **1956.** 2 figs., table, 5 refs **DWB, DLC**—Oceanographical conditions in the Sea of Japan are largely controlled by a mass o cold water which occupies about 85% of that sea, with stable water temperatures below 1°C. I this note a vertical cross section Vladivostok-Takeishi-Zaki is presented, showing variations of th upper boundary of the cold water mass. *Subject Headings:* **1. Ocean water masses 2. Ocea temperatures 3. Sea of Japan.**—*G.T.*

9F–136 551.465

Nan'niti, Tosiwo (*Met. Research Inst.*), **The turbulent fluctuations in a tidal current (On the structure of ocean currents, Pt. 2).** *Papers in Meteorology and Geophysics*, Tokyo, 7(2):161–170, July **1956.** 8 figs., 6 tables, 8 refs., 6 eqs. **DWB.** Also in: *Tokyo. Meteorological Research Institute. Oceanographical Laboratory, Collected Reprints, V. 4*, Reprint No. 50, May **1957.**—**Pt. 1,** *ibid.*, 5:248, **1955.**—The component of turbulent velocity in the direction of the mean flow has been studied for the tidal current off Cape Kan'non. The periods of the turbulent fluctuations recorded varied from several seconds up to a few minutes and these fluctuations seem to be caused by turbulence. The ratio of mean amplitude of fluctuations to the mean current was greatest at the bottom and smallest at mid-depths. The calculated values of $R(t)$, the auto-correlation coefficients, were seldom in accord with the theoretical result as $1 - R(t) \propto t^2$. *Subject Headings:* **1. Tidal currents 2. Turbulence in ocean currents 3. Oceanic turbulence.**—*Author's abstract.*

9F–137 551.461.2

Neumann, J. (*Israel Met. Service*), **On the range of variation in sea level.** *Journal of Marine Research*, New Haven, Conn., 15(3):204–211, **1956.** fig., table, 3 refs., 15 eqs. **DWB, DLC**—It is inferred from statistical theory that under "stationary" conditions, i.e., in the course of periods during which the mean sea level remains stable, the average range of sea level for intervals of time of given lengths should vary linearly with the logarithm of the length of time interval. This is an asymptotic property, so that the logarithmic law of increase in range holds only if the intervals considered are relatively long. To check on the inference, data of sea level at Tel Aviv are studied. It is confirmed that the average monthly, two-monthly, . . ., yearly, . . . ranges closely follow a logarithmic law of increase. *Subject Headings:* **1. Sea level variation range 2. Tel Aviv, Israel.**—*Author's abstract.*

9F–138 551.464:546.185

Okubo, A.; Matsumura, K.; Yoshimura, H.; Takeda, I. and Hasegawa, S., **On nutrient substances in the sea area east of Honshu, Japan, Pt. 1, Phosphate P.** *Journal of Meteorological Research*, Tokyo, 8(11):707–714, Dec. **1956.** 2 figs., 6 tables. In Japanese; English summary p. 707. **DWB, DLC**—Since 1954 seasonal oceanographic observations have been made by the Japan Meteorological Agency on board the observation ship, "Ryofu-maru," in the sea area of Honshu, Japan, and the features and variations of the Kuroshio and Oyashio waters were analyzed from the standpoint of physics and chemistry as well as biology. In this report, the authors described the method of chemical analysis of the nutrient substances in the sea water. Results were given in tables. *Subject Heading:* **1. Phosphate P in sea water.**—*Authors' abstract.*

9F–139 551.465(548)

Poornachandra Rao, C. (*Met. Off., Poona*), **Ocean currents off Visakhapatnam.** *Indian Journal of Meteorology and Geophysics*, Delhi, 7(4):377–379, Oct. **1956.** 2 figs., 2 refs., eqs. **DWB, DLC**—During an oceanographic cruise in March 1953, temperature and salinity measurements were made to depths of 400 m at eight stations arranged in a section perpendicular to the coast at Visakhapatnam (Bay of Bengal). Currents at depths of 50, 100, 150, 200, 250 and 300 m were calculated. The calculated current distribution with reference to the 400 m level is shown on a graph. The surface current was stronger at 15, 70 and 100 km from coast. The maximum surface current was at 70 km. Corresponding subsurface currents occurred where the surface current was strong. At depths greater than 100 m, the current was very weak at 100 to 125 km from the coast. The mean current for the area decreases progressively with depth if no motion is assumed at 400 m. *Subject Headings:* **1. Ocean currents 2. Bay of Bengal, India.**—*I.L.D.*

9F–140 551.46:550.3:016.3

Revelle, Roger R., **The oceans and the earth.** *Ciencia*, Mexico City, 16(11/12):290–291, **1956.** **DWB**—At least 75 research vessels from many countries will conduct oceanographic research during IGY. Forty-eight will cruise in the Atlantic and 25 in the Pacific. The U. S. will have 8 ships and the U.S.S.R. a dozen. The principal objective is to learn more about the deep-sea circulation from Arctic to Antarctic. A second aim is to make a continuous record of changes in sea level over the year at islands in the ocean (Island Observation Program). Some of the useful results of these programs are mentioned. *Subject Headings:* **1. IGY oceanographic program 2. Deep sea research.**—*M.R.*

9F–141 551.46:91.04

†Riccardi, Riccardo, **La Spedizione Oceanografica dell' "Albatross," intorno al mondo.** [The "Albatross" Oceanographical Expedition around the world.] *Societa Geografica Italiana, Bollettino*, Ser. 8, 9(9/10):453–467, Sept./Oct. **1956.** fig., 90 refs. English summary p. 467. **DWB, DLC**—On the occasion of the 1956 publication of the Italian translation of H. PETTERSSON's book, **Westward**

Ho with the "Albatross" (Milan, Baldini and Castoldi), the proceedings of the great Swedish ocea ographic expedition of the "Albatross" in 1947–1948 in the three oceans and in the Mediterranea Sea are here summarized. The expedition aimed at carrying out research especially on the se bottom sediments, drawing out a great number of "cores" with the powerful piston core sampler Kullenberg and measuring the thickness of the sediments by means of the Weibull method. Th article chiefly gives information on the important scientific results of the expedition. *Subje Heading:* **1. "Albatross" (Swedish Deep Sea) Expedition, 1947–1948.**—*Author's abstract.*

9F–142 532.59:551.4

Shuleĭkin, V. V., **Analiz izmereniĭ predel'no bol'shikh vetrovykh voln v okeane.** [Analysis data on the highest wind waves in the ocean.] *Akademiia Nauk SSSR, Doklady*, 110(1):53–5 **1956.** fig., 6 refs., eqs. **DLC**—The conditions for the development of waves in the ocean are no complicated by shallow water and hence the significant value of the turbulent kinematic viscosit of water is considerably smaller than in shallow seas. Hence, in determining the quantitativ characteristics of wave formation in the ocean, it is useful to analyze the elements of the larges waves on the basis of developed theoretical concepts. Also, an attempt is made to generalize th author's theory on the origin of long waves as a result of wind actions. The formula for determinin the force necessary to overcome the turbulence due to internal friction and the height of the wave are presented. The theoretical analysis of energy, velocity, etc. of these large waves is covere also. *Subject Heading:* **1. Ocean wave theory.**—*I.L.D.*

9F–143 551.551:551.556:532.593:551.4

Shuleĭkin, V. V. (*Maritime Hydrophysical Inst., Acad. of Sciences U.S.S.R.*), **Rol' tangentsial'nc sily vozdeĭstviia vetra v prirashchenii energii voln.** [Tangential force of the wind as a factor in creasing the energy of waves.] *Akademiia Nauk SSSR, Doklady*, 109(4):761–763, Aug. 1, 195 4 refs., 12 eqs. **DLC**—The author investigates the action of the wind upon the material particle of water which describes their orbits and simultaneously participate in a sufficiently slowly developin movement (with pulsating velocity of a wave flow). By analyzing the wave energy from this poin of view it is shown that the tangential force of the wind adds only a very small portion to that forc which is transmitted to the water particles by the normal action in the asymmetrical aerodynami field. This hypothesis is demonstrated mathematically. *Subject Headings:* **1. Tangential win stress 2. Wind-wave energy transfer.**—*I.L.D.*

9F–144 551.556:532.593:551.4

Shuleĭkin, V. V., **Utochnennyĭ zakon narastaniia dliny vetrovykh voln.** [A precise law for th growth of wind waves.] *Akademiia Nauk SSSR, Doklady*, 111(2):348–351, Nov. **1956.** fig. 8 refs., 21 eqs. **DLC**—The author develops a precise law expressing the growth of wind waves o the basis of purely theoretical considerations which involve the use of A. N. Nekrasov's theory o the potential energy of wind waves which is restricted to actual wind wave profiles. The expressio devised

$$\frac{h}{\lambda} = 0.04 + 0.103 \left(\frac{\lambda_0}{\lambda}\right) 2'/3$$

is compared with actual experimental measurements and close agreement is found. *Subject Heading* **1. Wind wave growth.**—*I.L.D.*

9F–145 551.46:551.556.8

Sirotov, K. M., **Zatukhanie morskikh voln i raschet ikh vysoty pri oslabevaiushchem vetre** [Decay of sea waves and calculation of their height with slackening wind.] *Meteorologiia i Gidrologiia*, No. 10:48–52, Oct. **1956.** 2 figs., 9 refs. **DWB, DLC**—In this study on the decay of waves with diminishing wind velocity, only those cases (112) were analyzed in which the wind slackening was continuous and more or less equal during the entire time of wave decay. The observational data were analyzed as follows: the dependence of wave decay upon their initial velocities, a determination of the mean probability of the maximum heights of waves at depths of 12 m, the calculation of the decrease of wave height during successive observation intervals, dependence of wave decay upon their height and dependence of $tg\alpha$ (expressing the relationship between wave decay and initial wind velocity) upon the acceleration of wind decay. A nomogram for computing the time of wave decay is constructed. *Subject Headings:* **1. Ocean wave decay 2. Wind effects on waves.**—*I.L.D.*

9F–146 551.46

*Texas. Agricultural and Mechanical College. Dept. of Oceanography. **Physical and meteorological data, Cruises 54-2, 54-9, and 54-10 of the A. A. Jakkula.** Contract N7onr-48702, Project NR 083 036, Data Report No. 4, March **1956.** unpaged. 3 figs., almost entirely tables **DWB**—Report gives detailed data for observed and standard depths as well as surface weather data

r 3 oceanographic cruises from Gulf of Mexico ports across the Gulf (2 cruises in a N-S direction nd 1 in a E-W direction, as shown on charts) during March, July and Aug.–Sept. 1954, respectively, mprising 81 stations and reaching a maximum depth of 2500 m (cruise 54-10 to Cuba). *Subject eadings:* **1. Oceanographic sounding data 2. Oceanographic cruises 3. "A. A. Jakkula" Cruise, 954 4. Gulf of Mexico.**—*M.R.*

9F–147 551.465

Timonov, V. V. and Zhukov, L. A., **Dinamicheskiĭ metod kak sovremennoe sredstvo izucheniia orskikh techeniĭ.** [The dynamic method as a modern means for the study of ocean currents.] *Meteorologiia i Gidrologiia*, No. 5:50–55, May **1956.** 3 figs., 6 refs., 7 eqs. **DWB, DLC**—The uthor discusses the value of the dynamic method in studying the properties of deep and surface cean currents where data are either inadequate or unavailable and proceeds to test the validity f this method by comparing theoretical results with observational data. Formulas for determining he relative bottom between stations of different depths are derived. Various applications of the ynamic method are described. *Subject Headings:* **1. Ocean current dynamics 2. Deep ocean urrents.**—*I.L.D.*

9F–148 551.46

*Tokyo. University of Fisheries, **Oceanographical and meteorological data (NORPAC Project).** ub. **1956?** 12 p. tables. **DWB** (551.46 T6460)—Detailed oceanographic and meteorological ata, obtained on the "Umitaka Maru" Sept. 11 to Oct. 21, 1955 between Japan and Hawaii and on ne "Shinyo Maru" from July to Sept. 1955, are tabulated with a few charts showing course of ruise and a brief text giving outline of project, procedure, personnel, methods of observation, analsis of observations, etc. Meteorological and surface data are presented separately from oceanographical and chemical data and BT data (given for observed and for interpolated levels to 1000 o 2000 m depth). *Subject Headings:* **1. Oceanographic data 2. Marine meteorological data . NORPAC Project 4. Western Pacific.**—*M.R.*

9F–149 551.556:551.46

†Woods Hole Oceanographic Institution, **Studies on the effect of wind on coastal waters, Nov. 6, 1955–Jan. 31, 1956.** Contract Cwb-8630, Quarterly Progress Report, Feb. **1956.** 3 p. table, 2 refs. **DWB**—A brief report on the initial stages of a project to study the wind-set-up relationship, nd the surge conditions in Nantucket Sound for developing improved forecasting techniques. vailable tide and weather data are listed (Nantucket, Woods Hole, Portland, Maine, and Montauk, ong Is., etc. for winter of 1953–54). Local conditions are discussed and 12 recent references on the ubject cited. *Subject Headings:* **1. Wind effects on coastal waters 2. Nantucket Sound. I. Miller, Arthur R. II. McCloskey, Margaret.**—*M.R.*

1957

9F–150 551.46:591.9

Beliaev, G. M. and Ushakov, P. V., **Nekotorye zakonomernosti kolichestvennogo raspredeleniia lonnoĭ fauny v vodakh Antarktiki.** [Some regularities in the quantitative distribution of bottom auna in Antarctic waters.] *Akademiia Nauk SSSR, Doklady*, 112(1):137–140, Jan./Feb. **1957.** ? figs., 3 tables, 9 refs. **DWB, DLC**—During the Antarctic Expedition of the Academy of Sciences of the U.S.S.R. in 1956, numerous samples of ocean fauna were taken from depths of 105 to 3200 m over an area between 64–67°S. lat. and 91–163°E. long. from Davis Sea to the Balleny Islands. Data are presented on the "biomass" (g/n^3) of different groups of animals in Antarctic waters at different depths, on the variation of the mean indices of biomasses of different groups as a function of depth, and on the variation of the general mass of benthos with depth. *Subject Headings:* **1. Bottom fauna distribution 2. Antarctic Ocean.**—*I.L.D.*

9F–151 551.463(98)

*Blacker, R. W. (*Fisheries Lab., Lowestoft*), **Benthic animals as indicators of hydrographic conditions and climatic change in Svalbard waters.** *Great Britain. Ministry of Agriculture, Fisheries and Food, Fishery Investigations*, Ser. 2, 20(10): **1957.** 49 p. 30 figs., 20 tables. **DWB** (M:551.56 G786bre).—A number of stenothermal (surviving only within a limited temperature range) species of benthic fauna were studied over a period of years in the Bear Island-Svalbard area as indicators of the limits of Arctic and Atlantic bottom water, and of the changes that have taken place as this water warms up (Atlantic water has been replacing Arctic water for several decades in this region). The monograph gives in great detail the past and present distribution of 10 species, their temperature and depth ranges and changes—some anomalous—in reproduction and development. Relation of the benthos to hydrographic conditions, recent changes in distribution of benthos and the probable mechanism producing these changes are also treated. Before 1930 the Arctic

currents were dominant in this area—the work of MOHN in 1883 showed that little water >2 covered bottom off West Spitsbergen. Now it covers most of this area. Thus, many Arctic spec are no longer present, being replaced by Atlantic species. Methods of collection and compilatio past work, etc. are covered. *Subject Headings:* **1. Climatic changes in Atlantic Arctic area 2. De sea temperature changes 3. Arctic Ocean.**—*M.R.*

9F–152 551.44

Bossolasco, Mario, **Le correnti marine e la determinazione delle loro caratteristiche.** [Mari currents and the determination of their characteristics.] *Geofisica e Meteorologia*, Genoa, 5 (3/4) :3 43, May/Aug. **1957.** fig., 6 refs., eq. **DWB, DLC**—After pointing out the unsatisfactory state contemporary knowledge of the characteristics of ocean currents, the author discusses critical various old and new methods employed in the study of ocean currents. With the use of floati bottles the path of a surface current can be determined only inexactly; a more precise determinati can be made for distances of 100 km by following the position of a bottle which is provided by lighting device or the location of the positions of bottles by radiogoniometers. The study of coast and bottom currents by means of electric current meters; the study of internal currents by t dynamical methods of SANDSTRÖM and HELLAND-HANSEN, of KRAUS and HIDAKA are summariz briefly. Also, an outline of the oceanographic investigations to be undertaken in Italy during IG 1957/58 is presented. *Subject Headings:* **1. Ocean current measurement 2. Italian IGY ocea ography program.**—*I.L.D.*

9F–153 551.46

Bossolasco, Mario and Dagnino, Ignazio, **Sulla turbolenza delle correnti marine nello stretto Messina.** [Turbulence of ocean currents in the Strait of Messina.] *Geofisica Pura e Applicat* Rome, 37 :318–324, **1957.** fig., table, 5 refs., 2 eqs. Italian and English summaries p. 318. **DLC** The authors present the results of some calculations carried out to obtain values of the vertic turbulence (by means of the coefficient of eddy-diffusion of salinity K_z) of the currents in the Stra of Messina. The maximum values of K_z are of the order of $.10^3$–10^4 cm^2/sec. *Subject Heading* **1. Ocean currents 2. Oceanic eddies 3. Strait of Messina.**—*Authors' abstract.*

9F–154 551.556.8 :532.593 (267.

*Chakravortty, K. C. and Bhattacharjee, R. C. (*both, Regional Met. Center, Calcutta*), **Analys of the wave observations in the Bay of Bengal.** *Indian Journal of Meteorology and Geophysic* Delhi, 8 (3) :313–320, July **1957.** 7 figs., 2 tables, 2 refs. **DWB, DLC**—Months of the year, perio of waves (sec) for various wind speed groups and months or seasons, and difference between heigh and speeds in July 1952 and in July 1953. About 2500 ship observations were used in the analysi Not much difference was found between July 1952 and 1953. Data are shown in tables, charts an diagrams. *Subject Headings:* **1. Wind-wave relationships 2. Bay of Bengal, India.**—*M.R.*

9F–155 551.556 :551.4

*Cox, Charles S., **Measurements of slopes of high-frequency wind waves.** Calif. Univ Scripps Institution of Oceanography, Contract AF 19 (604)-1053, Final Report, March 11, 195 34 p. 15 figs. (incl. photos), 4 tables, 9 refs., 5 eqs.—An attempt to describe statistically the typic shapes of the sea surface and their changes with time. The slope of the surface of the water rath than the elevation of the wavecrest above the mean water level is the parameter studied from measure ments made by optical methods in a laboratory (wind-water tunnel) and a few at sea. Non-linea effects were found to be most important for high frequency waves. Such effects as "increase i phase velocity due to finite amplitude, trapping of ripples on leading slopes of gravity waves an explosive growth of waves beyond a critical fetch" were noted. Data, equipment, records, curve etc. are presented to show the complete picture as well as the analysis. *Subject Headings:* **1. Win wave slope frequencies 2. Wave generation 3. Sea surface slopes.**—*M.R.*

9F–156 551.501.45 (26) :551.46.018 :5192

*Dorrestein, R., **Een nieuw statistisch hulpmiddel bij de interpretatie van scheepswaarneminge** [New statistical aid in the interpretation of ship's observations.] *Netherlands. Meteorologisc Instituut, Wetenschappelijk Rapport, WR* 57-009 (IV-015), **1957.** 22 p. fig., 6 tables, foot-refs. 15 eqs. English summary p. 21–22. **DWB** (M07.2 D716ni)—A thorough exposition of the develop ment, application and testing the validity of a statistical formula for estimating the number o periods (or frequency) of a given meteorological variable (A) in a given area (of the sea) when onl a few observations are available from ships, or when the observations occur in clusters. The formul is

$$PAE = N\frac{PAw - NAw\ Pw/Nw}{Nw - Pw},$$

where PAE = expected frequency, N = total time divided by standard time interval between ship observations; Pw = total number of series of cosmic observations in time interval; PAw = number of series of consecutive observations with at least one observation of condition A; Nw = total number of simultaneous observations; NAw = total number of simultaneous observations showing condition A. There must be no positive or negative correlation between the occurrence of A and making of an observation. An example for incidence of gale force winds at the lightship "Goeree" shows that a standard error of 16% would be involved if observations were available only 6 days a month, and 36% if only 2 isolated days observations were used. Reliable estimates require 10 or more occurrences a month ($\sigma = 5$). *Subject Heading:* **1. Statistical formula for marine climatology.**—*M.R.*

9F–157 532.59:551.46

*French West Africa. Direction Générale des Travaux Publics, **Comparaison des observations de houle effectuées à Lomé et Cotonou de 1952 à 1955 et de janvier 1955 à décembre 1956.** [Comparison of wave observations at Lomé and Cotonou from 1952 to 1955, and from Jan. 1955 to Dec. 1956.] Dakar. Bureau d'Étude de la Houle, Station des Almadies, **1957.** 13 p. 28 graphs. **DWB** (532.59 F873co)—Wave amplitudes, periods and directions observed at Lomé (Togo) and Cotonou (Fr. W. Africa) from 1952 to 1956 (supplemented by some observations from ships) are presented graphically. A study of these data shows that the waves (which reach as far north as Dakar in winter) all originate in depressions of the Southern Hemisphere. *Subject Headings:* **1. Ocean wave observations 2. Ocean wave periods 3. Lomé, Togo 4. Cotonou, French West Africa. I. Quitard, J.**—*G.T.*

9F–158 551.588.4:535.51:535.312

Funk, P., **Der Einfluss der Polarisation auf die Reflexion an Wasserflächen.** [Influence of polarization on reflection at water surfaces.] *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. A.*, Vienna, 10(2/3):224–241, **1957.** fig., 5 tables, 15 refs., 11 eqs. German, English and French summaries p. 224–225. **DWB, DLC**—An attempt is made to demonstrate exactly the influence of polarization of the light of the sky upon reflection on water surfaces by means of Fresnel reflection formulas and by assuming actual distribution of brightness of a cloud free sky. Theoretical methods for determining the degree of polarization of light of the sky and the amount of reflected light at a water surface, and also experimental results of the measurement of intensity of polarization (caloric and photometric), are presented. The mathematical formulas are derived for computing the dependence of the Fresnel reflection coefficients upon the refractive number and the calculation of the reflection coefficients of global radiation and of the reflection of global radiation at a water surface. The influence of the refraction number was shown to be negligible. Reflection coefficients of the sky light computed for solar altitudes of 0°, 20°, 40°, 60° from Dorno's measurements and for 90° by means of an empirically corrected radiation and polarization distribution according to Rayleigh. The influence of polarization upon the reflection at water surfaces was −1.13% for 0°, −0.55% for 20°, +0.18% for 40°, +0.47° for 60°, +0.83% for 90°. In extreme cases the effect of polarization can amount to 8–10% of the final value. The reflection coefficients of global radiation at a water surface were computed according to measurements of Dorno, Kimball and Lunelund and the calculation of reflection on a water sphere according to measurements of Dorno and Kimball. A discussion is presented of a number of recent studies on reflection of diffuse radiation on water surfaces. *Subject Heading:* **1. Polarization effects on water surface reflection.**—*Author's summary and I.L.D.*

9F–159 551.465

†Gakkel', Ia. Ia., **Materikovyĭ sklon kak geograficheskaia zona Severnogo Ledovitogo okeana.** [The continental slope as a geographical zone of the Arctic Ocean.] *Vsesoiuznoe Geograficheskoe Obshchestvo, Leningrad, Izvestiia*, 89(6):493–507, **1957.** 3 figs., 28 refs. **DLC**—In this study of the geographic characteristics of the continental slope as constituting a geographic landscape, the author begins by stressing a fundamental analogy between oceanographic and geographical processes, between atmosphere and hydrosphere, such as atmospheric and oceanic currents, geomorphologic phenomena on continents and in oceans, etc., and stresses the role of the surface separating hydrosphere from atmosphere as a factor in unifying both. On the basis of an extensive review of the literature he discusses the following: the influence of the ocean bottom upon oceanic currents, the influence of the ocean bottom upon surface as mediated through the currents, the role of currents in ice drifts and a comparison with the role of the wind, the nature and origin of unfrozen patches (polynia) in the Arctic Ocean including the role of atmospheric and oceanic factors involved in their formation and existence, the role of tidal currents in the condition of the ice cover, the climatic characteristics of the continental slope, the nature of synoptic conditions prevailing in this zone, the phenomena of the cracking of the ice cover, biogeographic features of the continental shelf, etc. Charts showing the mean monthly air temperature in Feb. and the mean monthly (March) number

of cyclones and their trajectories for the Arctic region and a photograph of a pulsating crack a presented. *Subject Headings:* **1. Bottom effects on ocean currents 2. Continental slope 3. Arct Ocean.**—*I.L.D.*

9F–160 551.46.018

Kalle, Kurt, **Ein einfaches Kleinaräometer zur exakten Bestimmung des Salzgehaltes i Meerwasser.** [A simple small-type areometer for the precise determination of salinity and densit in seawater.] *Deutsche Hydrographische Zeitschrift*, Hamburg, 10(3):99–108, June **1957.** 3 figs 3 tables, 3 refs. German, English and French summaries p. 99–100. **DWB**—The present pap describes a newly developed areometer for the determination of salinity and density of sea-wate The apparatus is distinguished by the following features: The areometer is extremely small, it construction is very compact; including preliminary rinsing, it requires only 60 to 80 cm^3 of sea-wate The volume of the areometer float itself is 7 cm^3 only. Besides, by suspending the float by a fin hair and suppressing surface tension by adding a few drops of detergent solution the float is enable to slide without friction. Owing to these two operations, the weight can be determined with so high a accuracy as 0.05 mg corresponding to a sensitivity of 0.01 ‰ S.—A compact torsion-balance whic at a convenient height, includes a circular reading scale, serves as a measuring instrument. Th total weighing range of the balance amounts to 200 mg, thus enabling the entire oceanic measurin range from 0 to 40 ‰ S to be determined without having to change the float. In comparison wit chlorinity titration, the new method offers the advantage of an increased sensitivity and a highe working speed, since in serial investigations reading of the indicator needle and of the thermomete is far less tiring than the troublesome addition of silver nitrate solution and the simultaneous ob servation of the equivalence point. The definitive determination of salinity is carried out with th aid of the two observed values of weight (on the torsion balance) and temperature (on the ther mometer) and a conveniently readable nomograph. The measuring procedure requires neither th use of chemicals, nor water connection, nor power equipment. *Subject Headings:* **1. Salinity measure ment 2. Density measurement 3. Areometers.**—*Author's abstract.*

9F–161 551.46:581.526.325.3

Kon, H., **Seasonal distribution of microplankton in the Tsugaru Straits, Northern Japan, with hydrographic bearing: observations on diatom communities in the year 1952–1956, Pt. 1.** *Journa of Meteorological Research*, Tokyo, 9(4):247–253, June **1957.** 8 figs., 7 refs. In Japanese; English summary p. 247–248. **DWB, DLC**—Monthly observations on plankton diatoms have been carried out in the Tsugaru Straits and neighboring sea areas for the year from 1952 to 1956. The Tsushima Current flowing northward in the Japan Sea issues a tributary current into the Tsugaru Straits; the fluctuation of this tributary flow of the Tsushima Current has great influence upon the hydro graphic environments in the Tsugaru Straits. The object of present studies is to find some character istic diatom communities which deserve to be used as biological indices for fluctuations of this tributary current. Principal results include: 1) occurrence of such species in large quantities in the strait, as commonly distributed in Japan Sea water, indicates the prevailing current streams into the strait and 2) increase in number of warm water preferring species (not oceanic warm current species) in the Tsugaru Straits from June to Aug. shows an effect of warming up the water due to invading current. *Subject Headings:* **1. Microplankton distribution 2. Tsugaru Strait, Western Pacific.**—*From author's abstract.*

9F–162 551.46:551.556

Krylov, Iu. M., **O sviazi mezhdu krutiznoĭ i vozrastom vetrovykh voln.** [Relation between steepness and growth of wind waves.] *Meteorologiia i Gidrologiia*, No. 1:26–33, Jan. **1957.** 2 figs., 3 refs., 19 eqs. **DWB, DLC**—Contemporary work on theory and calculation of wind waves is based upon an equation applying the law of conservation of energy to wind waves. This equation, written in dimensionless form, contains two unknown functions: steepness and growth of waves: the former ∂ is defined as the relationship of wave height h to wave length x; the latter β—the relationship of phase velocity of wave s to wind velocity V. A theoretical equation for computing these unknowns is developed by the author and it is verified by instrumental data of synchronous measurement of waves and winds at sea. It is shown theoretically that, during their growth and subsidence in a storm zone, wind waves are a turbulent pulsation of the surface layer of the sea. A relationship is established between mean steepness of waves and mean growth of waves which holds for the growth and subsidence of waves in a storm area. The theoretical conclusions are verified by experimental data. The measurements of the functional relationship between mean heights and mean periods of waves in a storm region are established theoretically and verified experimentally. The relationship includes wind velocity as a parameter. A nomogram is presented for calculating the height of wind waves at a point from the known values of the mean period τ and mean (for 10–15 min) wind velocity v at the horizon 10–15 m. *Subject Headings:* **1. Wind wave theory 2. Wind wave steepness.**—*I.L.D.*

9F–163 551.350.6(267.4)

La Fond, E. C. and Bhavanarayana, P. V. (*both, Andhra Univ., Waltair*), **On a thermal feature of bottom water during upwelling on the east coast of India.** *Indian Journal of Meteorology and Geophysics*, Delhi, 8(2):209–212, April **1957.** fig., 6 refs. **DWB, DLC**—Temp. and salinity profiles of coastal waters off Waltair in March 1956 show an unusual isothermal layer at the bottom over the continental shelf—the cause being attributed to upwelling and turbulent mixing from strong currents flowing over a rough bottom. The location and thickness of this isothermal layer should permit the determination of the location of the maximum current along the continental shelf. *Subject Headings:* **1. Oceanographic profiles 2. Bottom currents 3. Upwelling effects 4. Waltair, India 5. Bay of Bengal, India.**—*M.R.*

9F–164 551.465:551.556

Lineĭkin, Pavel Samoilovich, **Osnovnye voprosy dinamicheskoĭ teorii baroklinnogo sloia moria.** [Basic problems of a dynamic theory for the baroclinic layer of the sea.] Leningrad, Gidrometeorizdat, **1957.** 138 p. 10 figs., 37 refs., numerous eqs. At head of t-p.: Gosudarstvennyi Okeanograficheskii Institut. **DWB** (551.46 L754os)—A monograph covering systematically recent knowledge of the dynamic theory of wind currents in a baroclinic sea of uneven depth. Turbulent exchange and density diffusion are considered in the theoretical treatment, and the solutions are applied to a number of practical problems in oceanography and hydrography. The 6 chapters cover: 1) fundamental problems of dynamic wind currents in a baroclinic sea; 2) partial solution of the basic problems; 3) steady (balanced) currents in canals and a spherical sea; 4) special problems of the dynamics of the baroclinic layer of the sea; 5) unsteady (non-balanced) currents in canals; 6) steady currents in an infinite ocean. Upwelling subsurface currents, shape of basin. *Subject Headings:* **1. Wind driven currents 2. Dynamic theory of wind currents.**—*M.R.*

9F–165 551.465

Masuzawa, Jotaro (*Japan Met. Agency*), **An example of cold eddies south of the Kuroshio. (Currents and water masses of the Kuroshio system, Pt. 7.)** *Records of Oceanographic Works in Japan*, Tokyo, New Ser., 3(1):1–7, March **1957.** 3 figs., 6 refs. **DWB**—During the period from the spring of 1955 to early summer 1956, a cold isolated cyclonic eddy was observed south of the Kuroshio Current. Charts show details of water temperatures at 100 m depth and surface current velocities in Feb., May, Aug. and Nov. 1955, and in Feb., May and June 1956, respectively. The modifications and movements of this eddy are clearly traced and the vertical temperature distribution shown on cross sections along 144° and 147°E. (For Pts. 1–6, *see* 9D–63, –96, –97 and –130, April 1958, *MAB.*) *Subject Headings:* **1. Oceanic eddies 2. Water mass transport 3. Sea temperatures 4. Kuroshio Current 5. Northwest Pacific.**—*M.R.*

9F–166 551.46

Nagasaki, Japan. Marine Observatory, **Outlines of some principal researches in progress at Nagasaki Marine Observatory.** *Oceanography and Meteorology*, Nagasaki, Japan, 8(1/2), Paper No. 9, Dec. **1957.** (Reprint of 6 p.) 4 figs. **DWB**—The status of research projects currently conducted at the Observatory is outlined. The projects include: 1) study of gusty wind storms in winter in the eastern China Sea and adjacent seas west of Kyushu (observation from weather ships, etc.), 2) investigation of tidal phenomena in Ariake Bay by means of model experiments and 3) ten-day marine reports for the eastern China Sea. *Subject Headings:* **1. Oceanographic research 2. Japan.**—*G.T.*

9F–167 551.463:534.8

Nanda, J. N. (*Naval Hdq., New Delhi*), **On origin of fluctuations of sound transmissions in the sea.** *Indian Journal of Meteorology and Geophysics*, Delhi, 8(3):325–328, July **1957.** ref., eqs. **DWB, DLC**—Fluctuation in transmitted intensity of sound when there is no relative movement of transducers and no interference from reflection at sea surface, has been usually assigned to thermal microstructure of the oceans. Thermal microstructure can affect the transmission in two possible ways: by scattering due to small changes of velocity of sound, or due to interference of neighboring rays going through varying number of thermal patches and reaching the same receiving hydrophone. Both these effects require very prominent and practically impossible thermal structure in order to explain the observed fluctuations. A hypothesis is put forward that this may be due to the presence of discrete scatterers in the form of tiny air bubbles which may be free or what is more likely part of zooplankton. On confirmation this may yield a powerful tool for measuring average production of plankton in the sea of various sizes depending upon the selected sound frequency. The fluctuation of 15.5 Kc frequency sound transmissions suggests that air bubbles or zooplankton air sacks of size $\frac{1}{2}$ mm should occur at the rate of one in every 76 liters of sea water in the ocean west of Cochin, South India. *Subject Heading:* **1. Sound transmission in sea water.**—*Author's abstract.*

9F–168 551.46:532.59

Neumann, Gerhard and Pierson, Willard J., Jr., **Detailed comparison of theoretical wave spectra and wave forecasting methods.** *Deutsche Hydrographische Zeitschrift*, Hamburg, 10(3):73–92 June **1957. Pt. 2,** *Ibid.*, 10(4):134–146, Aug. **1957.** 13 figs., 3 tables, bibliog. p. 145–146, 44 eqs English, German and French summaries p. 73–74. **DWB**—Theoretical wave spectra derived by J. Darbyshire and G. Neumann, and a modification of Neumann's results by H. U. Roll and G. Fischer, are compared with a carefully computed observed spectrum and with average period significant height, and slope observations. Observations of waves for one of the two most intens storms in the North Pacific for a 35 year period are compared with forecasts made by the Sverdrup Munk-Bretschneider wave forecasting method, the Pierson-Neumann-James method and the Darbyshire method. It is shown that the Neumann spectrum agrees best with the observed spectrum. It correctly predicts the significant height, and it is consistent with average period considerations, with sea surface slope considerations, and with the properties that the sea should have when photographed. Moreover, for wave observations for one of the most intense storms in the North Pacific, the Sverdrup-Munk-Bretschneider and Pierson-Neumann-James-methods agree within a few feet for the significant height. The Darbyshire method is too low by more than 12 feet although the sea was not fully developed, and it would have forecast a fully developed sea. The Roll-Fischer modification leads to discrepancies with the observable characteristics of the composite wave pattern which cannot be resolved by changing the constant of the spectral function in order to adjust the total wave energy to suit the wave height characteristics. *Subject Headings:* **1. Ocean wave spectra 2. Wave forecasting.**—*Authors' abstract.*

9F–169 551.556:551.46

New York Univ. College of Engineering. Dept. of Meteorology and Oceanography, **Directional spectrum of a wind generated sea as determined from data obtained by the Stereo Wave Observation Project.** Prepared by Joseph Chase, et al. Contract Nonr 285(03), [unnumbered report], July **1957.** 267 p. figs., tables, refs., eqs. Contents: Pierson, Willard J., Jr., **Introduction** p. 1–2 Vetter, Richard C., **Cooperating agencies and organization,** p. 3–17. Marks, Wilbur, **History of stereo-photography of ocean waves,** p. 18–25. Marks, Wilbur and Ronne, F. Claude, **Operational procedure,** p. 26–30. U. S. Hydrographic Office, **Wave forecasts,** p. 31–39. U. S. Hydrographic Office, **Photogrammetric evaluation of Project SWOP,** p. 40–48. Pierson, Willard J., Jr.; Marks, Wilbur and Chase, Joseph, **Preliminary analysis, choice of grid spacing, and discussion of aliasing,** p. 49–57. Cote, Louis J. and Pierson, Willard J., Jr., **Equations for leveling the data, estimating the spectra, and correcting the wave pole records,** p. 58–81. Mehr, Emanuel and Stephenson, George, **The leveled data, the numerical analysis, and the numerical results,** p. 82–133. Pierson, Willard J., Jr., **Analysis of wave pole data,** p. 134–147. Pierson, Willard J., Jr., **The stereo pairs and the interpretation and analysis of the directional spectrum in terms of wave theory,** p. 148–252. Pierson, Willard J., Jr., **Conclusions and recommendations,** p. 253–256. Braunstein, Simeon, **The dimensional stability of photographic films,** p. 257–267. **DWB** (532.59 N532d)—A complete report on a project to obtain the two-dimensional directional spectrum of sea waves from stereo-photographs obtained by two airplanes flying tandem above the sea surface over a predetermined area in the N Atlantic (just off the N. Atlantic Coast). The calculations, made by UNIVAC data, are given *in extenso* and the method of making the spectral estimates elaborated and illustrated in great detail Meteorological conditions were evaluated in picking data and area for flight observations. Synoptic conditions during these periods are illustrated and discussed. Weather observations are also given in detail. Work was done in the fall of 1954. Results from this method agree well with theoretically calculated spectra using G. Neumann's (1954) method, but neither method agrees with the wave-pole data. Cross-checks, using the various methods of obtaining spectra, should be made. Results are useful in forecasting waves. *Subject Headings:* **1. Wind wave spectra 2. Directional wave spectra 3. Electronic computer application to oceanography 4. North Atlantic. I. Chase, Joseph.**—*M.R.*

9F–170 551.465:551.501.8

Nikitin, I. S., **Radiolokatsionnyĭ metod izucheniia morskikh techeniĭ.** [Investigation of ocean currents by means of radar.] *Meteorologiia i Gidrologiia*, Leningrad, No. 4:47–50, April **1957.** 6 figs., ref., 3 eqs. **DWB, DLC**—The author describes the radar he developed in 1946 to measure oceanic surface currents. Similar radar was developed in 1950 at the Institute of Oceanography at Monaco, namely, the APQ-13 radar station. The two types of angular reflectors situated on floats are described with the aid of illustrations. The author stresses the superiority of the drifting radar constructed by him; the reflections are only 3–4 m above sea level (80 m above sea level in Monaco). It is capable of measuring amounts under a wind velocity of 6 m/sec and also during stronger winds. The base for the radar is a trailing spar buoy upon whose upper story is the reflector. A graphical and vector method for obtaining the true elements of the surface currents is presented. It was found that when the drift coefficient of the equipped spar-buoy or of the float is less than 0.01 then, regardless of wind velocity, its influence can be neglected. If the drift coefficient

of these structures is between 0.01 and 0.03, it is necessary to use the method of calculating wind effect described in the article ($\bar{v}_t = (1+a)\bar{v}_\alpha a v_t$). If the drift coefficient is greater than 0.03, then the use of the recommended radar procedures is described only for weak winds (up to 3 balls). *Subject Headings:* **1. Ocean currents 2. Radar current measurement.**—*I.L.D.*

9F–171 551.556:532.593:551.46

Ogata, T. and Kanemizu, K., **On the relation between sea waves and surface wind velocity, Pt. 1.** *Journal of Meteorological Research*, Tokyo, 9(2):105–113, March **1957.** 6 figs., 5 tables, 7 refs., 3 eqs. In Japanese; English summary p. 105. **DWB, DLC**—The authors examined the relationship between sea waves and surface wind velocity. The principal results are as follows: 1) Comparison of wave observation made by instruments and eye-seeing; 2) Observational results of wave at Tango were examined, especially in relation to passing cyclone or typhoon; 3) Observational results of wave at Extra were examined; 4) Comparison of the relation between wave height and wind velocity obtained by SVERDRUP's theory and observational examination. *Subject Heading:* **1. Wind-wave relationships.**—*Author's abstract.*

9F–172 551.526.6:551.515.23:551.46

O'Hare, Joseph E. (*U. S. Navy Hydrographic Off.*), [**Comments on**] **Herbert Riehl: Sea surface temperature anomalies and hurricanes.** *American Meteorological Society, Bulletin*, 38(4):226–227, April **1957.** fig., ref. **DWB**—Warm current eddies, formed when the equatorial current or Gulf Stream strike a land barrier, are believed to be a better source of convective energy for hurricane formation than would be any anomalies discovered on 5° square monthly mean charts such as used by RIEHL. Such eddies were discovered in 1950 in the Gulf Stream area by a Woods Hole-Hydrographic Office ship survey. Mechanisms for hurricane production, structure of eddies, absence in S. Atlantic and suggestions for finding these eddies by ship or aerial surveys, are noted. (For abstract on original, *see* 7K–176, Nov. 1956, *MAB.*) *Subject Headings:* **1. Ocean current eddies 2. Hurricane formation 3. Sea surface temperature anomalies 4. Gulf Stream.**—*M.R.*

9F–173 551.465:551.556

Sarkisian, A. S., **K teorii neustanovivshikhsia vetrovykh techenii v odnorodnom okeane.** [Contribution to the theory of instability of wind currents in a homogeneous ocean.] *Akademiia Nauk SSSR, Izvestiia, Ser. Geofiz.*, 10:1232–1237, Oct. **1957.** 27 eqs., table, 2 refs. **DLC**—The author attempts to solve the problem of non-stationary wind currents in a uniform ocean, taking into consideration both variations in the Coriolis parameter with latitude. The formulation of the problem assumes that, at the initial time ($t=0$), these excited velocity fields distinct from the sphere of the relief of a free surface. Over the ocean there prevails a wind whose field of tangential pressure is an arbitrary function of coordinates and time. The variations of the current fields of surface level due to wind action are determined. The equations providing these solutions are derived and solved. At $t \propto 0$ the formulas are transformed into the corresponding stationary problem. The time of establishment (or disappearance) of currents after the discontinuation of wind action, the use of the equations, etc. are discussed. *Subject Headings:* **1. Wind driven currents 2. Tangential wind stress.**—*I.L.D.*

9F–174 551.465:551.556

Sarkisian, A. S., **O nestatsionarnykh vetrovykh techeniiakh v odnorodnom okeane.** [Nonstationary wind currents in a homogeneous ocean.] *Akademiia Nauk SSSR, Izvestiia, Ser. Geofizich.*, No. 8:1008–1019, Aug. **1957.** 4 figs., 11 refs., 30 eqs. **DLC**—The problem of the origin and establishment of nonstationary wind currents in a homogeneous ocean is solved without taking into account the variations of Coriolis force with latitude. An analytical solution is obtained for an infinite ocean. The theoretical formulation of the problem involves the determination within a linear framework of the nature of the adaptation of the field of the hydrodynamic elements of a uniform ocean to the field of tangential wind pressure regarded as an arbitrary function of coordinates and of time. The linearity of the formulated problem presents the constituent current velocities and the slope of the surfaces to be considered as the sum of two magnitudes determined by the initial values of current velocities and slope, which die out with time, and by the field of the currents and slope determined by the tangential wind friction that varies with time. The development of the theoretical equation is presented and an actual computation of the origin establishment of the surface relief for a region of the northern Atlantic under the influence of Azore maximum. *Subject Headings:* **1. Wind driven currents 2. Coriolis force.**—*Author's abstract and I.L.D.*

9F–175 551.465:551.556

Sarkisian, A. S., **Opredelenie statsionarnykh vetrovykh techniĭ i naklona urovnia v odnorodnom okeane.** [Determination of stationary wind currents and the surface gradient in a uniform ocean.]

Akademiia Nauk SSSR, Izvestiia, Ser. Geofiz., No. 5:616–627, May **1957.** 5 figs., 6 refs., 30 eq
DLC—The problem of the determination of stationary currents and surface gradient produced
winds is solved for an infinite ocean with constant depth taking into account the variation of t
parameter of Coriolis force with latitude. Equations are developed for expressing the three co
stituents of current velocity (non-zonal velocity) by atmospheric pressure and surface gradient, f
expressing (the height of a point of the surface of the ocean in undisturbed state) by atmospher
pressure and for zonal flow. Results of actual calculations for the Pacific Ocean are presente
It is shown that the direction of non-zonal flow at a given point in the ocean is determined by t
tangential field of wind pressure acting over the entire equator of the ocean. This is particular
true of the western part of the ocean. Isolines of flow on the surface layer of the ocean are oft
close to the isolines of the field of pressure in that layer of the ocean. In calculating the stationa
non-zonal circulation in a homogeneous ocean, it is possible to neglect friction in comparison wi
the change in the Coriolis parameter with latitude. *Subject Headings:* **1. Wind driven curren
2. Coriolis force.**—*I.L.D.*

9F–176 551.4

Sasaki, Tadayoshi; Okami, N.; Watanabe, S. and Oshiba, G. (*all, Sci. Res. Inst., Tokyo*
Measurements of the angular distribution of daylight in the sea. *Records of Oceanographic wor
in Japan, Tokyo, n.s., Special No.* compiled by the Pacific Science Liaison Committee of the Scien
Council of Japan. Pub. by Japanese National Commission for UNESCO, March **1957.** p. 42–4
4 figs., 5 refs. **DWB**—Report on measurements of the angular distribution of submarine dayligh
made on Nov. 2 and 3, 1955 in the center of Hunka Bay, 11 mi off Muroran, when the sky was cle
and the sea calm. Equipment is described and illustrated, and light vector diagrams in horizont
and vertical planes (at 10 and 15 m depth) reproduced and discussed. Results indicate an oval ligh
distribution envelope, with maximum elongation at 0° (both for horizontal and vertical planes) an
minimum at 90°, and there is larger frontal than near scattering. *Subject Headings:* **1. Submarin
light distribution 2. Angular distribution of daylight in sea 3. Hunka Bay, Japan.**—*M.R.*

9F–177 551.4

Schmitz, H. P., **Eine Leitfähigkeits Methode der Wellenmessung im Küstenbereich.** [A co
ductivity method for measuring coastal waves.] *Acta Hydrophysica*, Berlin, 4(1):5–25, 195
5 figs., 6 refs., 43 eqs. **DLC**—The form of waves are recorded by means of the resistance to an electri
current flowing between two stationary vertical rods immersed in the water. The intensity of th
water itself does not have to be known. The theory is outlined and a few actual records are show
Subject Headings: **1. Wave statistics 2. Oceanographic instruments.**—*A.A.*

9F–178 551.461.2:525.

Sekerzh-Zen'kovich, T. Ia., **K zadache o rasprostranenii prilivnoĭ volny v prolive.** [Th
problem of the propagation of tide waves in a strait.] *Akademiia Nauk SSSR, Izvestiia, Se
Geofizich.*, No. 4:493–503, **1957.** 17 figs., 2 refs., 29 eqs. **DLC**—The propagation of tide waves i
a sound is examined by taking into account the Coriolis force. A definite periodic oscillation o
surface level is assumed and the propagation of these oscillations along the strait is investigate
The length of the strait is not taken to be arbitrary but is determined in the course of the solution o
the problem so that it be solved with sufficiently simple calculations. A solution is demonstrate
for the case in which, at one end of the strait, the surface level varies according to a simple harmoni
law $A \cos \sigma t$ and at the other $\beta \cos(\sigma t - \xi)$, where σ = frequency, ξ = initial phase, A & B—amplitude
Cotidal charts of the spread of tide waves for a number of cases were constructed. *Subject Heading
1. Sea level variations 2. Coriolis force.*—*I.L.D. and author's abstract.*

9F–179 551.4

Seymour, Allyn H.; Held, Edward E.; Lowman, Frank G.; Donaldson, John R. and South
Dorothy J., **Survey of radioactivity in the sea and in pelagic marine life west of the Marshall Islands
September 1–20, 1956.** *U. S. Atomic Energy Commission, [Report] No.* UWFL-47, March 15
1957. 57 p. 12 figs., 9 tables, 12 refs. **DLC**—A survey of the radioactivity in the sea in the regio
of the North Equatorial Current from the Marshall Islands to the Mariana Islands was made i
Sept. 1956. Plankton samples were taken by oblique tows from 200 meters and water samples wer
taken from the surface, 25, 50, 100 and 150 meters at 74 stations. The general pattern of distributio
of radioactivity shows a sharp decrease east of Bikini and a gradual but irregular decrease west o
Eniwetok. A slight degree of contamination is indicated as far to the west as Guam, the wester
extremity of the survey. Non-fission products account for a large proportion of the radioactivity
in plankton and fish samples. *Subject Headings:* **1. Radioactivity in sea water 2. Radioactive
contamination of plankton 3. Western Pacific. I. Washington [State] Univ. Applied Fisheries
Lab. II. Contract AT(45-1)540.**—*Authors' abstract.*

9F–180 551.556:551.46

Shuleĭkin, V. V., **Eshche o kinematike morskikh voln.** [More on the kinematics of sea waves.] *Akademiia Nauk SSSR, Doklady*, 113(5):1043–1045, **1957.** 2 figs., 4 refs., 9 eqs. **DLC**—Shows that the profile of wind waves in the sea can be expressed as

$$x = \frac{\lambda}{2\pi}\theta + a \sin \theta, \qquad y = C \cos \theta.$$

λ—wave length. The constants a and C are not just empirical values describing the profile but have a distinct physical meaning, explained on the basis of oscillations of the drift current. *Subject Headings:* **1. Wind waves 2. Sea waves.**—*A.A.*

9F–181 551.46

*†Tait, John Barclay, **Hydrography of the Faroe-Shetland Channel, 1927–1952.** Edinburgh, H. M. Stationery Off., **1957.** 309 p. 81 figs. (many fold.), numerous tables, bibliog. p. 111–113. (*Scotland. Home Dept., Marine Research*, No. 2, **1957.**) **DLC** (GC 491.T3). Review by G. E. R. Deacon in *Nature*, London, 181(4604):214–215, Jan. 25, **1958.**—Volume transport of water mass through two parallel sections of the Faroe-Shetland Channel was calculated from temperature and salinity data obtained in 69 cruises from 1927 to 1952 (excluding the war years 1940–1945). The values obtained are presented in tables and vertical sections and discussed in detail. Several changes in circulation during this period are in evidence, such as an increase in volume transport to a maximum in Dec. 1951, infusion of Gulf of Gibraltar water into the Channel (1930–1939), invasion of Arctic water (maximum in 1949–1950), etc. Evidence is also found of turbulence which is attributed to rugged topography and convergence of different water masses. *Subject Headings:* **1. Water mass transport 2. Oceanic circulation 3. Faroe-Shetland Channel.**—*G.T.*

9F–182 551.46(08)

UNESCO Symposium on Physical Oceanography, Tokyo, Oct. 19–22, 1955, Proceedings. Pub. by UNESCO and Japan Society for the Promotion of Science, **1957.** 292 p. figs., tables, refs. or bibliog. at end of each paper. In English; résumés in French. **DWB**—Nearly 50 papers on Physical Oceanography delivered at a conference in Tokyo on Oct. 19–22, 1955 of the UNESCO Interim Advisory Committee on Marine Science are presented. Those which are of interest to meteorologists and physical oceanographers are abstracted separately and listed in Part III. Sessions on oceanographic instrumentation, oceanic circulation and information were headed by G. Bohnecke, G. E. R. Deacon and R. Revelle, respectively. Delegates (from 14 countries) and observers are listed. The papers are grouped according to the 3 categories: 11 papers on instruments, 20 on circulation and 15 on reports from various countries or on various aspects of work. For listing of pertinent papers, *see* Part III, this issue. *Subject Headings:* **1. Oceanographic symposia 2. Oceanographic instruments 3. Oceanic circulation. I. Japan Society for the Promotion of Science.**—*M.R.*

9F–183 551.465:532.59

†Walden, H. and Farmer, H. G., **Auswertung von Seegangsregistrierungen des Forschungsschiffes "Atlantis" mit dem "ship-borne wave recorder" sowie Vergleich mit entsprechenden Seegangsberechnungen aus den Windverhältnissen (hindcasting).** [Evaluation of sea records obtained from the "ship-borne wave recorder" on board the research vessel "Atlantis" and comparison with corresponding wave computations from wind conditions ("hindcasting").] *Deutsche Hydrographische Zeitschrift*, Hamburg, 10(4):121–134, Aug. **1957.** 7 figs., 6 tables, 20 refs. German, English and French summaries p. 121–122. **DWB**—On a cruise with the research vessel "Atlantis" in the North Atlantic, in Nov. and Dec. 1956, sea records were obtained from the "ship-borne wave recorder" after M. J. Tucker. Two different statistical methods were used in evaluating these records, viz. 1) mean values were computed from the records and 2) the respective mean values were derived from a wave spectrum that beforehand had been obtained by special analysis. The resulting values are compared with one another. From the analysis it is found that the relative width of the wave spectrum is significant in determining the wave heights, whether treating recorded wave data or determining the wave height from a forecast or hindcast wave spectrum. The effect is computed according to Cartwright and Longuet-Higgins. The values of wave height and wave period obtained from the records are compared to the corresponding values derived by different methods from weather maps ("hindcasting"). The significant wave heights hindcast by H. Walden, are higher, those computed by means of J. Darbyshire's procedure are lower than the appropriate observed values. The values of periods hindcast according to the methods by Bretschneider-Wilson and by Darbyshire are, on an average, greater; those determined from the diagrams by Walden are smaller than the values of periods obtained from the shipborne wave recorder. *Subject Headings:* **1. Ocean wave spectra 2. Forecasting wave height 3. North Atlantic.**—*Authors' abstract.*

9F–184 551.465:532.

Walden, Hans and Piest, Jürgen, **Beitrag zur Frage des Wellenspektrums in der Windsee** [Studies on the problem of the ocean wave spectrum in the wind sea.] *Deutsche Hydrographisc Zeitschrift*, Hamburg, 10(3):93–99, June **1957.** 2 figs., 6 refs., 10 eqs. German, English and Frenc summaries p. 93. **DWB**—This paper tries to clear some errors or inaccuracies which occurred several publications on ocean wave spectra. The fundamental suggestions by G. Neumann ar H. U. Roll-G. Fischer are, above all, made the special subject of this discussion. Final elucidatic on wave spectra will not be reached, however, until the elaboration of a great number of suitabl records of ocean waves becomes available. *Subject Heading:* **1. Ocean wave spectra.**—*Author abstract.*

9F–185 551.4

†*Waldichuk, Michael (*Fisheries Res. Bd. of Canada*), **Physical oceanography of the Strait Georgia, British Columbia.** *Canada. Fisheries Research Board, Journal*, 14(3):321–486, 1955 70 figs., 25 tables, 75 refs., eqs. **DWB, DLC.** [Contribution Washington No. 205 (State). Uni Dept. of Oceanography.]—A major monographic contribution to the oceanography of inland strai or estuaries, including abundant graphical and tabular supporting material and a good bibliograph The work is nicely printed, in contrast to many similar works which are issued in ephemeral forr The Strait of Georgia lies between Vancouver Island and the mainland of British Columbia ar between Seymour Narrows and the San Juan Islands of Washington State. Waters are a mixtu of fresh water from the Fraser River and the deep salt waters of the Strait of Juan de Fuca, mixe somewhat by tides. Data used in this survey were taken from the cruises of the HMCS "Ceda wood," and CNAV "Ehkoli" during 1949–53. Synoptic surveys at 70 stations distributed throug out the Strait were made at 10 depths (to 91.4 m). Currents were measured, drift bottle dat (1926–31) analyzed and other physical and chemical data used to form a picture of the seasona changes in water masses and the fresh water and heat budget using available meteorological dat for 5 stations. In the heat budget analysis for 5 stations (Ch. 8, p. 459–476), the fact is stresse that the region is a heat source in summer (and the ocean a heat sink) owing to the net outflow surface water seaward, (and the reverse, at times, in winter). In the mixed region at the S. en the waters are cool— in the stratified region in Central and N. portions, the surface water is warm i summer and cold in winter. Evaporation, sunshine, cloudiness, radiation, back radiation, etc. a calculated for each month for 5 locations, and the energy used in evaporation calculated for on Convective (sensible) heat exchange and heat transported by currents away from the area a analyzed and discussed. Runoff accounts for 20 m (depth) of water a year; precip. for 1.2 m condensation 0.1 m. Salinity is 33.8 ‰ and outflow about 6 to 20 times the river discharge. *Subje Headings:* **1. Oceanographic surveys 2. Heat budget of estuaries 3. Energy exchange sea atmosphere 4. Strait of Georgia, B. C.**—*M.R.*

9F–186 525.63:551.4

Whittingham, H. E. (*Divisional Met. Office, Brisbane*), **The interaction between flood and tid at Brisbane.** *Australian Meteorological Magazine*, Melbourne, No. 18:21–29, Sept. **1957.** 3 figs table, 3 eqs. **DWB**—The height curve of the 1931 flood at Brisbane is subjected to a harmon analysis in order to separate the tidal fluctuations from the flood water heights. The tidal residua are then correlated with predicted tides at the Pile Light, Moreton Bay, and it is shown that th tidal oscillations at the Port Office are reduced by about 60% of their normal amplitude during major flood. *Subject Headings:* **1. Flood-tide relationships 2. Tidal fluctuation 3. Brisban Australia.**—*Author's abstract.*

9F–187 551.556:551.4

Wilson, Basil W., **Incipient wind-generation of ocean waves by a Norther.** *American Meteor logical Society, Bulletin*, 38(7):399–404, Sept. **1957.** 7 figs., table, 3 refs. **DWB.** "Paper presente 140th Nat. Meeting of AMS, Oct. 1955, Oklahoma A. and M. Stillwater, Okla."—An analysis of th meteorological and oceanographic conditions encountered by the "A. A. Jakkula" during an ocean ographic cruise on March 6, 1955 in the Gulf of Mexico east of Galveston in connection with th passage of a "Norther." Excellent photographs of wave and squall conditions are included alon with the synoptic and isochronal charts. The wind was from the south (13–15 km) with 4′ to southerly swells of 5 to 6 sec. period. The wind became calm about 1315 h. Then with the adver of the N. wind, northerly ripples developed on the otherwise glassy southerly swells, and thes northerly ripples developed into waves whose height and period are hindcast and compared wit observed values. Charts and nomograms used are included. *Subject Headings:* **1. Wind generatio of ocean waves 2. Northers, Gulf of Mexico 3. "A. A. Jakkula" Cruise—March 6, 1955 4. Gu of Mexico.**—*M.R.*

9F–188 551.46

†*Wüst, Georg (*Institut f. Meereskunde, Kiel Univ.*), **Quantitative Untersuchungen zur Statik und Dynamik des Atlantischen Ozeans (sechste Lieferung), Stromgeschwindigkeiten und Strommengen in den Tiefen des Atlantischen Ozeans.** [Quantitative investigations on the statics and dynamics of the Atlantic Ocean (6th installment), Current velocities and the magnitude of currents in the depths of the Atlantic Ocean.] *Deutsche Atlantische Expedition (Meteor)*, 1925–1927, *Wissenschaftliche Ergebnisse*, Vol. 6, Pt. 2. Berlin, Walter de Gruyter, **1957.** p. 261–420. 6 figs., 36 plates, 50 refs. English summary p. 416–418. **DWB, DLC**—Several volumes of the scientific results of the "Meteor" expedition of 1925/27 have been issued between 1932 and 1939 (*see* 5A–70, Jan. 1954, *MAB*). This excellent volume continues the analysis and presentation of the basic and derived data on: I. the dynamics of the profiles and the deep sea current velocities, II. the balance of net transport in the various layers on both sides of the Atlantic Central Ridge and III. the balance of salt transport in the two longitudinal troughs of the South Atlantic. Current velocities from 3 to 17 cm/sec are encountered along the west margin of the South Atlantic at deep levels with southerly components in the northern and northerly currents in the S. (Antarctic) portions. Velocities are higher than those estimated previously. Austausch coefficient (eddy diffusivity) averages 27–29 $cm^{-1}g\ sec^{-2}$. The work is packed with extensive tables, charts, cross-section, graphs, maps and a good bibliography. *Subject Headings:* **1. "Meteor" Expedition, 1925–1927 2. Deep water circulation of Atlantic 3. Atlantic Ocean.**—*M.R.*

9F–189 551.465:551.553.21

Wyrtki, Klaus, **Die Zirkulation an der Oberfläche der südostasiatischen Gewässer.** [Surface circulation in southeast Asian waters.] *Deutsche Hydrographische Zeitschrift*, Hamburg, 10(1):1–13, **1957.** 3 figs., 2 plates (charts), 12 refs. English and French summaries p. 1. **DWB**—Surface currents in southeast Asian water between 25°N and 20°S and between 85°E and 143°E are represented in six charts for every second month. The variations of the circulation during the course of the year are correlated with those of the monsoons. The different branches of the circulation are taken under consideration and the position of their boundaries, of the current axis, and of counter currents are discussed. *Subject Headings:* **1. Oceanic circulation variation 2. Monsoon-oceanic circulation relationships 3. Western Pacific.**—*Author's abstract.*

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9F–190 551.462:532.593

†Cartwright, D. E. (*Nat. Inst. of Oceanography, Wormley, Surrey*), **The scientific study of ship motions.** *Science Progress*, London, 46(181):83–91, Jan. **1958.** 40 refs. **DLC**—Recent literature on theory and experimental findings concerning relationships of wave action and ship motion, including meteorological aspects of wave generation, is reviewed. After dwelling on the hydrodynamical theory, upon which simplified approximations deriving ship motion spectra from wave spectra are based, the author suggests that "the rapid development of electronic computing methods may render unnecessary further mathematical studies of simplified cases, by allowing numerical solution of otherwise intractable equations." Other lines of progress include improvement of tank model, techniques and measurements at sea. *Subject Headings:* **1. Wave motion 2. Ship motion due to waves.**—*G.T.*

9F–191 551.593.1:551.46

Cwilong, B. M., **Anomalous atmospheric refraction at sea.** *Nature*, London, 181(4603):181, Jan. 18, **1958. DWB, DLC**—Note on deviations in astronomical sightings taken every minute in series from noon to 1 p.m. and from 9 to 9:20 a.m. and 3 to 3:20 p.m. during voyage of research yacht "Princess Waimai" in 1954. All told, 46 noon sights, curves and 72 others were taken all in good weather in the tropics on Atlantic crossings. A Henry Hughes sextant with accuracy of ±0.5 min of arc was used. At least 24% of sight points divided by 2 min or more of arc from interpolated curves. Dividing points appeared in groups of 3 to 5 consecration points but at combination the sign of deviation changes. Morning sights show least frequency deviation (15%) and noon or afternoon greatest. Explanation is given in terms of anomalous atmospheric refraction. *Subject Headings:* **1. Anomalous atmospheric refraction 2. Optical refraction at sea 3. Astronomical refraction 4. Tropical Atlantic.**—*M.R.*

9F–192 551.461.2:551.515.8

Darbyshire, J. (*Nat. Inst. of Oceanography, Wormley, Surrey*), **A preliminary investigation of long waves at Newlyn.** *Royal Meteorological Society, Quarterly Journal*, 84(359):66–69, Jan. **1958.** 3 figs., 4 refs., 4 eqs. **DWB, DLC**—Long waves of period greater than ½ min are recorded at Newlyn, Cornwall. There are two predominant types; one with a period of approximately 12 min and

another with a period of 30 to 40 min. This investigation deals only with the longer-period type an is concerned with the eight instances during the period March 1956 to March 1957 where these longe waves exceeded 7 in. in amplitude. The occurrence of these waves appears to be associated with th passage of meteorological fronts and a reasonable correlation is found between the amplitude an the northward component of the frontal velocity, whilst the duration of the wave activity appear to decrease as the easterly component of the frontal velocity increases. Various suggestions regarc ing the nature of these waves are considered. The evidence that they are edge waves is not ver convincing and the most likely explanation appears to be that the waves are due to the oscillatio of Mounts Bay as a whole, or of the north-western part of it. *Subject Headings:* **1. Ocean swe 2. Mounts Bay, Cornwall, Eng.**—*Author's abstract.*

9F–193 551.46

Krauss, Wolfgang, **Wie entstehen Meeresströmungen?** [How do ocean currents originate? *Umschau*, Frankfurt, a.M., 58(2):45–48, Jan. 15, **1958.** 6 figs., 4 foot-refs. **DLC**—A non-technica discussion of the characteristics and the factors determining the origin of oceanic currents. description with the aid of diagrams is given of the zonal current system in lower latitudes (tropica and subtropical latitudes) and of the current system in the moderate and subpolar latitudes (current at the continental shelf, at the polar front and along the coast). The difficulties in a physica interpretation of ocean currents are due to the lack of sufficient observations and the complexit of the mathematical equations which, since they involve seven variables (three velocity components pressure, density, temperature and salinity) have a limited solution. Accordingly, the element are analyzed individually and our present knowledge on the role of the wind in causing oceani currents, the effect of external disturbing elements, such as oceanic temperature distribution, as consequence of radiation relationships, distribution of salinity as a consequence of precipitation an evaporation, the influence of fresh water advection, and on the variable intensity of mixing ar summarized. *Subject Heading:* **1. Ocean current theory.**—*I.L.D.*

SUPPLEMENTARY MATERIAL

9F–194 57(26

Danske Dybhavsekspedition Jorden Rundt, 1950–1952. [Galathea Deep Sea Expedition, 1950 1952, described by members of the Expedition.] Ed. by Anton F. Bruun, Sv. Greve, and others Trans. from the Danish by Reginald Spink. N. Y., Macmillan, **1956.** 296 p. photos, fold. map **DLC** (Q115.D343). (Original Danish "Galatheas jordomsejling, 1950–1952," published Copenhagen 1953. **DLC** Q115.D34.) Review of English (London, Allen and Unwin, 1957) edition, *Scienc Progress*, 46(181):182, Jan. **1958.**—The "Galathea" Expedition through the Atlantic, Pacific an Indian Oceans resulted in greater advances in our knowledge of the abyss than any since that of th "Challenger" in 1872–1876. The greater part of the book deals with marine biological research but several chapters describe the ecology and ethnology of little-visited islands, and there is also on chapter on **Echo-sounding and hydrographical studies** and another on **Geomagnetic investigations** A map shows the route of the expedition. *Subject Headings:* **1. Marine biological research 2. Deep sea research 3. "Galathea" (Danish Deep Sea) Expedition, 1950–1952. I. Brunn, A. F.** (*ed.*) **II. Greve, Sv.** (*ed.*) **III. Mielche, H.** (*ed.*) **IV. Spärck, R.** (*ed.*) **V. Spink, R.** (*trans.*)—*From th review.*

9F–195 551.46

†Deacon, G. E. R., **Marine research: the work of the National Institute of Oceanography** *Royal Society of Edinburgh, Proceedings, Sec. A* (*Mathematical and Physical Sciences*), 64(4):350–368 **1956/1957.** 2 figs., plate, 21 refs. **DWB, DLC**—The National Institute of Oceanography a Wormley near Godalming, Surrey was established in 1949 with Government support to continue th "Discovery" investigations (which had gone on for 20 yrs), and the oceanographic work of th Admiralty Research Laboratory and later that of the Hydrographic Dept. The Research Shi "Discovery II" (built in 1929) will take part in IGY research in collaboration with U. S. vessels Both biological and physical problems are emphasized. Energy exchange between atmosphere an oceans, effect of wind and pressure changes on sea surface, the general circulation of the ocean free and forced oscillations and organic matter in the oceans are among the long-term problem being investigated by outstanding oceanographers. These are discussed at some length by th present director of the Institute, with comments on work accomplished as well as that in progress Studies of waves, swell, currents, seiches, wind drag, and instrument development (wave recorders are among those reported. *Subject Headings:* **1. Oceanographic research 2. National Institute o Oceanography, Wormley, Eng.**—*M.R.*

9F–196 551.46

Deacon, G. E. R. (*Nat. Inst. of Oceanog., Surrey*), **The oceans.** (In: Bates, D. R. (*ed.*), **The Earth and its atmosphere.** N. Y., Basic Books, **1957.** p. 74–87.) **DLC**—A popular summation of current knowledge of the oceans: sources of energy, tides, waves, long waves (storm surges, tidal waves, swells), ocean currents, deep water circulation, mixing in the oceans, marine biology, mean sea level, and Antarctic oceanography. The material is presented as background material for those interested in IGY. *Subject Heading:* **1. Oceanography.**—*M.R.*

9F–197 551.465

Eady, E. T. (*Imperial Coll. of Sci. & Tech., Univ. London*), **The general circulation of the atmosphere and oceans.** (In: Bates, D. R., (*ed.*), **The Earth and its atmosphere.** N. Y., Basic Books, **1957.** p. 130–151. 5 figs.) **DLC**—The general or planetary air currents, temp., rainfall, clouds and winds; effect of the oceans, meridional circulation, heating, and the stratosphere are discussed lucidly and illustrated by original schematic diagrams. It is emphasized that the mean flow in the atmosphere or ocean is not the only cause, by any means, since large and small eddies play an important role in even the long term behavior, by diffusing heat or energy across the mean currents. Differences and similarities between the mechanisms in the atmosphere and the ocean are elaborated on. *Subject Headings:* **1. General circulation 2. Oceanic circulation.**—*M.R.*

9F–198 551.46:532.59(02)

U. S. Weather Bureau, **Observing and reporting sea and swell,** prepared by the Observations and Station Facilities Div., Wash., D. C., March **1958.** 16 p. 13 figs., 4 tables, 5 refs. **DWB** (M01.1 U587tr)—A nontechnical manual (with clever illustrations) for the mates of cooperative weather reporting ships. The 7 chapters cover: I. Wave observation techniques; II. Distinction between sea and swell; III. Characteristics of a simple wave; IV. Sea waves; V. Observational methods; VI. Wave reporting procedure; VII. Synoptic wave chart. Examples usually show wave heights or lengths in comparison with the dimensions of a ship. *Subject Headings:* **1. Ocean wave reporting manuals 2. Sea and swell reporting.**—*M.R.*

9F–199 551.556.8:551.463

Abe, Tomosaburo, **Tentative analysis of wind wave data in view of the foaming of sea water, Pt. 2, (Study on the foaming of sea water, 12th Report).** *Tokyo. Meteorological Research Institute, Oceanographical Lab., Collected Reprints,* Vol. 4, No. 48, May **1957.** reprint p. 39–44. 2 figs., table, 4 refs. In Japanese; English summary p. 39. **DWB**—The author treated tentatively the relation between wind speeds in the wind wave scale 3 and the surface water temperatures in an open sea using the data of oceanographical observations taken at the Northern Fixed Points (39°N, 153°E) in the North Pacific Ocean in relation to the foaming of sea water. Using the calculated values of it from oceanographical data, he could ascertain that the higher the surface water temperature becomes, the lower the degree of foaming. This relationship coincided fairly well with the results of his previous report. *Subject Headings:* **1. Foam layer of sea water 2. Wind wave data 3. Sea surface temperatures 4. North Pacific.**—*From author's abstract.*

9F–200 525.63:551.465

Miyazaki, M. and Nakano, M., **Tide and tidal currents in the Akashi Straits, Pt. 1.** *Tokyo, Japan. Meteorological Research Institute. Oceanographical Lab., Collected Reprints,* Vol. 4, No. 51, May **1957.** reprint p. 73–81. 3 figs., 6 tables, 8 refs. In Japanese; English summary, p. 73. **DWB**—Tidal observations have been made at several stations along the Akashi Straits in order to estimate the tidal currents and to investigate the minute distribution of tidal waves in it. In this paper, the results of observations and investigations up to date are given. *Subject Headings:* **1. Tidal currents 2. Akashi Straits.**—*Authors' abstract.*

9F–201 551.526.6(265)

†*Robinson, Margaret K., **Sea temperature in the Gulf of Alaska and in the Northeast Pacific Ocean, 1941–1952.** *California. Univ. Scripps Institution of Oceanography, Bulletin,* 7(1):1–98, **1957.** 61 figs., 17 tables, bibliog. p. 94–98. **DWB** (M26.6 C153se), **DLC**—The results of the analysis of 16,103 individual bathythermograph temperature observations and 129 serial reversing thermometer observations in the Gulf of Alaska and Northeast Pacific Ocean are presented in monthly charts of average temperature for 100-ft levels between the surface and 400 ft. In addition there are charts of average annual temperature cycles, average vertical temperature sections, typical individual bathythermograph temperature curves, and typical T-S curves in the area. The major features in the temperature distribution are discussed. A statistical analysis of temperature variation at three locations within the area is presented. *Subject Headings:* **1. Sea temperature data 2. Sea temperature variations 3. Gulf of Alaska 4. Northeast Pacific.**—*From author's abstract.*

PART III. REVIEWS, TRANSLATIONS, RECENT MONOGRAPHS, AND ANALYTICS FROM SERIALS AND COLLECTED WORKS

Note: Material listed in these sections will not be included in the monthly indexes until abstracted. The item number is mentioned for those titles which have been abstracted in previous issues of **Meteorological Abstracts and Bibliography.**

A. REVIEWS OF IMPORTANT METEOROLOGICAL MATERIAL

Marcello, Alessandro: **Phänologischer Atlas für den Beobachtungsdienst des italienischen phänologischen Netzes** [Phenological atlas for the Observation Service of the Italian Phenological Network]. Florence, Accademia Italiana di Scienze Forestali, 1954. 266 p. numerous figs. plate (in color). Review by Max Onno in *Wetter und Leben*, Vienna, 9 (6/9) :129–130, 1957.

Noodt, Eberhard: **Temperatur- und Salzgehaltsanomalien in Tiefenhorizonten des Atlantischen Ozeans** [Temperature and salinity anomalies in the deep layers of the Atlantic Ocean]. Dissertation, Christian-Albrechts-University, Kiel, 1955. 58 p. 23 figs., 6 maps. Review by E. Bruns in *Petermanns Geographische Mitteilungen*, Gotha, 10 (4) :286, 1957.

Platt, Raye R. (ed.): **Finland and its geography.** London, Methuen, 1957. 510 p. Maps and plates. Price 60 sh. [Ch. 14 on **Climate**]. Review by A. C. O'Dell in *Geographical Journal*, London, 23 (4) :529–530, Dec. 1957. "Seems to be identical with 1955 ed. by Duell, Sloan and Pearce, N. Y."

Rodewald, Martin: **Klima und Wetter der Fischereigebiete West- und Südgrönland** [Climate and weather of the West and South Greenland fishing areas]. *Beiträge zum Wettergeschehen in Deutschen Nordeuropäischen Gewässern*, No. 3, 1955 (pub. by Deutscher Wetterdienst, Seewetteramt, Hamburg). 99 p. 42 figs., 27 plates. Price DM 6. Review by R. Holzapfel in *Petermanns Geographische Mitteilungen*, Gotha, 10 (4) :286, 1957.

Schnelle, K. W.: **Das klimatische Kurwesen im Streit der Meinungen** [Health resort climate as a subject of controversy]. *Archiv für Physikalische Therapie*, 9 :368, 1957. Review by W. Undt in *Wetter und Leben*, Vienna, 9 (6/9) :132, 1957.

Schirmer, Hans: **Die räumliche Struktur der Niederschlagsverteilung in Mittelfranken: ein Beitrag zur Frage der örtlichen Unterschiede in den Niederschlagssummen** [Spatial structure of the precipitation distribution in middle Frankonia: contribution to the problem of local differences in precipitation totals]. *Forschungen zur Deutsche Landeskunde*, Vol. 81, 1955 (issued by Bundesanstalt f. Landeskunde, Remagen). 62 p. 31 figs., Price D 6.35. Review by Karl Knoch in *Petermanns Geographische Mitteilungen*, Gotha, 10 (4) :282, 1957.

Steel, R. W. and Fisher, C. A. (eds.): **Geographical essays on British tropical lands.** London: George Philip and Son, 1956. 344 p. maps, diagrs., tables. Review by William A. Hance in *Economic Geography*, 34 (1) :92–93, Jan. 1958.

Steinhauser, Ferdinand: **Beiträge zur Hochgebirgsmeteorologie** (**Die Meteorologie des Sonnblicks I. Teil**) [Contributions to high mountain meteorology (Meteorology of Sonnblick, Pt. 1)]. Vienna, Sonnblick-Verein, 1957. 180 p. 25 figs., 117 tables (plus 25 in pocket). Price, $2.40. Announcement in *Sonnblick Verein, Jahresbericht*, 51/53, for 1953–1955, inside front cover.

Steinhauser, F.: **Die Aufgaben und Arbeiten des Internationalen Geophysikalischen Jahres und Österreichs Anteil** [Tasks and work of the IGY and the participation of Austria]. Reprinted by Austrian International Geodetic Commission from *Osterr. Zeitschrift für Vermessungswesen*, Vienna, Vol. 45, No. 2 and 3, 1957. Review by W. Undt in *Wetter und Leben*, Vienna, 9 (6/9) :130, 1957.

Steinhauser, F.: **Meteorologische Gesichtspunkte zur Planung von Industrie- und Atomkraftanlagen im Raum von Wien** [Meteorological considerations in the planning of industrial and atomic plants in the Vienna area]. *Der Aufbau*, Nov. 1956, p. 467. Review by W. Undt in *Wetter und Leben*, Vienna, 9 (6/9) :132, 1957.

von Kármán, Theodore: **Aerodynamik** [Aerodynamics]. Geneva, Interavia, 1956. 224 p. 72 figs., 4 plates. Price, DM 22.50. Review by Jürgen Zierep in *Beiträge zur Physik der Atmosphäre*, Frankfurt, a.M., 29 (4) :318, 1957.

Zierer, Clifford (ed.): **California and the Southwest.** N. Y., Wiley; London, Chapman and Hall, 1956. 376 p. numerous figs., and plates. Price, $11.25. Review in the *Scottish Geographical Magazine*, Edinburgh, 73(3):187–188, Dec. 1957.

B. TRANSLATIONS AND RECENT MONOGRAPHS

TRANSLATIONS

Astapovich, I. S.: **Motion picture photography of meteors: methodologic proposals.** (Trans. of original Russian in *Ashkhabad. Asirofizicheskaia Laboratoriia* [*Report*], No. 145:18–20, 1954.) Trans. issued as ASTIA AD-128-661.

Begizov, A. D. and Riabinin, P. I.: **Slides and motion pictures.** (Trans. of original Russian **O diafil'makh i kinofil'makh,** in *Meteorologiia i Gidrologiia*, Leningrad, No. 6:40, June 1956.) Trans. available for reference DWB (471.335 B417con).

Berliand, Mark E.: **Forecasting and regulating the thermal cycle of the surface layer of the atmosphere.** (Original Russian **Predskazanie i regulirovanie teplovogo rezhima prizemnogo sloia atmosfery,** issued Leningrad, Gidrometizdat, 1956. 434 p. 94 figs., 24 tables, 525 refs., eqs. Review by P. N. Tverskoĭ in *Meteorologiia i Gidrologiia*, No. 11:51–52, Nov. 1956, translated into English and available DWB (M11 T9677bo).) (*For abstract on original Russian work, see* 8.8–9, Aug. 1957, *MAB*)

Dranevich, E. P.: **Forecasting the development of advective fog in Leningrad Oblast.** (Trans. of original Russian **Opyt prognoza razvitiia advektivnykh tumanov nad Leningradskoĭ oblast'iu,** in *Meteorologiia i Gidrologiia*, No. 8:26–28, Aug. 1956. 2 figs., table, 3 refs.) Trans. available DWB (M09.325 D764ex).

Gershman, B. N. and Ginzburg, V. L.: **Mechanism of the formation of inhomogeneities in the ionosphere.** (Trans. of original Russian **O mekhanizme vozniknoveniia ionosfernykh neodnorodnosteĭ,** in *Akademiia Nauk SSSR, Doklady*, 100(4):647–650, Feb. 1955. 14 refs., 4 eqs.) Trans. by Morris D. Friedman, Inc., Needham Heights, Mass., available for reference DWB (M10.535 G381o).

Hoffmeister, C.: **Atmospheric currents at a height of 120 km.** (Trans. of original German **Die Strömungen der Atmosphäre in 120 km. Höhe,** in *Zeitschrift für Meteorologie*, 1(2/3):33–41, Nov./Dec. 1946. 8 figs., 2 tables, 5 refs.) Trans. available DWB (M57.2 H711ai). (*See* 4F–32, June 1953, *MAB*)

Lettau, Heinz: **Synthetic climatology.** (Trans. of original German **Synthetische Klimatologie,** in *Germany. Deutscher Wetterdienst in der US-Zone, Berichte*, No. 38:127–316, 1952. 4 figs., 3 tables, 8 refs., 50 eqs.) Trans. available from Special Libraries Association Translation Center (John Crerar Library, Chicago), as its No. 57-3314. (*See* 4.2–101, Feb. 1953, *MAB*)

Muchnik, V. M.: **Chain process of accumulation of discharges in thunder clouds.** (Trans. of original Russian **Tsepnoĭ protsess nakopleniia zariadov v grozovykh oblakakh,** in *Akademiia Nauk SSSR, Doklady*, 99(4):537–538, Dec. 1, 1954. 5 refs., 5 eqs.) Trans. available Special Libraries Association Translation Center as its R-1438. (*See* 7.1–349, Jan. 1956, *MAB*)

Pavlova, E. N.; Rodionov, S. F. and Sholokhova, E. D.: **Energy distribution in the light spectrum of the night sky.** (Trans. of original Russian **Raspredelenie energii v spektre svetimosti nochnogo neba,** in *Akademiia Nauk SSSR, Doklady*, 98(5):769–771, Oct. 11, 1954. fig., 13 refs.) Trans. by E. R. Hope issued as *Canada. Defence Research Board, Translation* T-225-R, Aug. 1957, p. 1–4. (*See* 6.11–220, Nov. 1955, *MAB*)

Voigts, Henrich: **Meteorology in German secondary schools.** (Trans. of original German **Die Meteorologie in den höheren Schulen,** in *Meteorologische Rundschau*, Berlin, 9(5/6):104–108, May/June 1956. table, 65 refs.) Trans. available DWB (M02 V894me). (*See* 7.10–32, Oct. 1956, *MAB*)

Zavarina, M. V.: **The atmosphere.** (Translation of various sections of original Russian, **Atmosfera,** issued Leningrad, Gidrometizdatvo, 1956. 127 p. 16 refs., 54 figs.) Trans. available DWB (M10 Z39atm).

RECENT MONOGRAPHS

American Insurance Association, N. Y.: **Studies of floods and flood damage, 1952–1955.** May 1956. 296 p. 24 figs., 12 tables, 40 refs.

Angell, James K.: **Application of routine transosonde data to analysis and forecasting.** *U. S. Weather Bureau, Training Paper*, No. 13, April 1957. 33 p. 7 figs., 6 refs., 34 eqs.

Australia. Bureau of Meteorology: **Meteorology** [of] **Mawson, Heard and Macquarie Islands, 1954.** *Australian National Antarctic Research Expeditions, A.N.A.R.E. Reports, Series D*, Vol. 7, June 1957. 220 p. Almost entirely tables

Buskirk, E. R.; Iampietro, P. F. and Welch, B. E.: **Variations in resting metabolism with changes in food, exercise and climate.** *U. S. Quartermaster Research and Development Center, Natick Environmental Protection Research Div., Technical Report*, EP-59, May 1957. 19 p. 3 figs. 3 tables, 42 refs.

Changnon, S. A., Jr. and Stout, G. E.: **Tornadoes in Illinois.** *Illinois. State Water Survey Div. Circular*, No. 63, 1957. 11 p. 6 figs., table, 4 refs.

Coates, Robert J.: **Measurement of atmospheric attenuation at 4.3 mm wavelength.** *U. S. Naval Research Laboratory, NRL Report* 4898, April 2, 1957. 10 p. 4 figs., table, 4 refs., 2 eqs.

Countryman, Clive M.: **California fire weather severity in 1956.** *U. S. Forest Service. California Forest and Range Experiment Station, Forest Research Notes* No. 118, Feb. 5, 1957. 7 p. 4 figs. 3 foot-refs.

Frost, R. E.: **A reconnaissance for a Southern Greenland Ice-cap access for military purposes** *U. S. Snow Ice and Permafrost Research Establishment, Technical Report* 46, April 1957. 18 p. 8 figs. (incl. photos), 7 refs.

Hamburg. Seewetteramt: **Meteorologische Beobachtungen von deutschen Feuerschiffen der Nord- und Ostsee, Bundesrepublik, 1954** [Meteorological observations of the German lightships in the North and Baltic Seas, for the Federal Republic, 1954]. Its *Einzelveröffentlichungen* No. 15, 1957. 109 p. Mostly tables. (*For abstract on 1953 issue, see* 9.1–87, Jan. 1958, *MAB*)

Harper, Horace J.: **Effects of fertilization and climatic conditions on prairie hay.** *Oklahoma. Agriculture Experiment Station, Bulletin*, No. B-492, June 1957. 23 p. 2 figs., 11 tables.

Haurwitz, B.; London, J. and Valovcin, F.: **Seasonal variation of the vertical ozone distribution at Flagstaff, Arizona.** N. Y. University College of Engineering. Research Div. Dept. of Meteorology and Oceanography, Contract AF 19(604)-1738, Scientific Report, No. 2, June 1957. 23 p. 6 figs., 4 tables, 12 refs.

Hoehne, Walter E.: **Field evaluation of model XA rainfall rate and total catch indicator** [A supplement to NRL Memorandum Report 613]. *U. S. Naval Research Laboratory, NRL Memo Report* 638, Oct. 1956. 4 p. 7 figs., ref.

Hulburt, Edward Olson: **Measurements and estimates of sky brightness for all altitudes of the sun for various altitudes of the observer above the surface of the earth.** *U. S. Naval Research Laboratory, NRL Report* 4870, Feb. 8, 1957. 13 p. 10 tables, 9 refs., 4 eqs. Reprint of a paper prepared Dec. 1951.

Institute for Advanced Study, Princeton, N. J.: **Atmospheric Radiation Project.** Final interim report on Contract Nonr-1358[01] prior to transfer to M.I.T., covering Feb. 1, 1954–Aug. 31, 1957. Issued 1957. 5 p. 5 refs.

Jordan, C. L.: **Estimating central pressure of tropical cyclones from aircraft data.** *U. S. Weather Bureau, National Hurricane Research Project Report*, No. 10, Aug. 1957. 12 p. 6 figs., table, 10 refs., 7 eqs.

MacFarlane, M. A.: **The Wadsworth orthogonal polynomial technique over the North Polar Area during 1955.** McGill Univ. Arctic Meteorology Research Group, Contract AF 19(614)-1141, Supplement No. 1 to Scientific Report, No. 3, Oct. 1957. 4 p. 9 figs., 5 tables, 4 refs. (*For abstract on Scientific Report, No. 3, see* 8.10–27, Oct. 1957, *MAB*)

McClure, R. M. and Smith, H. W.: **Statistical analyses of selected tropospheric microwave refractive index recordings.** Texas. Univ. Electrical Engineering Research Lab., Contract AF 19(604)-2249, Report No. 6–22, July 31, 1957. 9 p. 14 graphs, 2 refs.

Natário, Agostinho Pereira: **Tendência barométrica** [Barometric tendency]. *Macao. Serviço Meteorológico, Notas Científicas*, No. 10, 1957. Legends in English and Portuguese. 14 p. 2 figs., 3 tables. English summary, p. 7

Natário, Agostinho Pereira: **Tufões que assolaram Macau** [Typhoons that have devastated Macao]. Macao, Impresa Nacional, 1957. 20 p. 8 figs. (some fold), photos. Legends in English and Portuguese for figs. 1–4 given on p. 19–20

Netherlands. Meteorologisch Instituut: **Indische Oceaan Oceanografische en Meteorologische Gegevens** [Indian Ocean oceanographic and meteorological data]. 2d ed. Its *Uitgave* (Publication), No. 135, pub. 1952. (Vol. 1), Text. 31 p. charts, tables. (Vol. 2), Charts. 24 oversize charts. "Replaces the former edition, *Publication*, No. 104, entitled **Oceanographische en Meteorologische Waarnemingen in den Indischen Oceaan.**" (*For abstract on Pub. 104, see* 5B–41, Feb. 1954, *MAB*)

Sauberer, Franz: **Über Lichtmessungen und- Registrierungen an der Zentralanstalt für Meteorologie und Geodynamik in Wien** [Light measurements and records in the Central Institute of Meteorology and Geodynamics in Vienna]. n.d. 6 p. 2 figs. (*Available for reference DWB*)

Sekiguti, Takeshi: **Mizu-keizai no Tachiba kara nuta Nippon no chi-iki kubun** [Regional division of Japan according to the hydrological cycle]. *Japan. Research Council for Natural Resources. Land Subcommittee, Technical Paper*, No. 154, 1951. 38 p. 31 figs., numerous tables. (In Japanese.)

U. S. Air Weather Service: **The system for programming funding and installation of fixed meteorological facilities on Air Force bases.** Its *Air Weather Service, Manual* 86-1, April 1, 1957. 14 p. tables

U. S. Weather Bureau: **Rainfall intensity-frequency regime, Pt. 1, The Ohio Valley.** Its *Technical Paper*, No. 29, June 1957. 44 p. figs., tables, 12 refs., eq.

C. METEOROLOGICAL ARTICLES APPEARING IN RECENTLY ISSUED PUBLICATIONS

Acta Geophysica Polonica, Warsaw, Vol. 5, No. 3, 1957

Olczak, T.: **O udziale Polski w III Miedzynarodowym Roku Geofizycznym 1957–1958,** [Polish participation in the IGY, 1957/1958], p. 145–175

Vol. 5, No. 4, 1957

Stenz, Edward: **Precipitation, evaporation and aridity in Afghanistan,** p. 245–266

Lambor, Julian: **Évaluation du coefficient d'écoulement pour les prévisions hydrologiques,** [Evaluation of the runoff coefficient for hydrological forecasting], p. 267–276

Tomashenko, R.: **Nekotorye osobennosti indeksa zonal'noĭ tsirkuliatsii v Europe,** [Some characteristics of the zonal index in Europe], p. 277–282

Przewłocki, K.; Krzuk, J.; Jurkiewicz, L. and Owsiak, T.: **Aparatura do profilowania naturalnego promieniowania beta i gamma w poziomych odwiertach dla poszukiwań soli potasowych,** [Apparatus for radioactive logging in horizontal boreholes for prospecting for potassium salts], p. 283–307

Ołpińska-Warzechowa, K.: **Polska bibliografia MRG,** [Polish IGY bibliography], p. 308–309

Acta Meteorologica Sinica, Peking, Vol. 28, No. 1, 1957 [All articles in Chinese, with Russian or English summaries]

Tsen, Khan-ë: **O kharakternoĭ osobennosti tsirkuliatsii atmosfery i ee sviazi s navodneniem na Basseĭne reki Iantszy i Khuaĭkhe KNR v 1954 godu,** [Characteristics of atmospheric circulation and its relation to the flood on the Yangtze River basin and Huaihe in the Chinese People's Republic in 1954], [Russian summary, p. 12]

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